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THE PREVALENCE OF INFLUENZA

United States.—A wave of respiratory diseases, including the "common cold" and cases diagnosed as influenza, has swept over parts of the eastern section of the United States.

In New York City the number of cases of influenza reported increased from 68 for the week ended January 3, 1931, to 1,140 for the week ended January 24. The next week the number dropped to 646 cases. New Jersey reported 26 cases of influenza for the week ended January 3, 1931, and 967 cases for the week ended January 31. Maryland, North Carolina, and South Carolina reported similar increases in the prevalence of influenza.

The table on pages 358 and 359 shows that for the week ended January 31, 1931, 12,828 cases of influenza were reported to the Public Health Service. Of these cases nearly two-thirds (8,461) were in the South Atlantic States, and 60 per cent (7,785) were in the three States of Maryland, North Carolina, and South Carolina.

Many States reported increased prevalence of influenza for the week ended January 31 as compared with the preceding weeks, but the figures were comparatively small except in the Eastern and Southeastern States.

The death rate in large cities for the week ended January 31, as reported to the Bureau of the Census, was 15.2 per 1,000 population, as compared with 13.7 per 1,000 for the week last year and an average of 14.3 for the corresponding weeks of the last five years.

Europe.—Incomplete reports from European countries indicate that the prevalence of influenza increased in Poland in November. In December the disease was reported in Germany and France. Yugoslavia, Denmark, Switzerland, and Spain have also reported increased prevalence of influenza. In Europe the disease has been very mild. A report dated January 19, 1931, from the British Ministry of Health stated that there was no definite epidemic of influenza in England. There was a slight increase in influenza deaths, but they followed usual seasonal movements. The general mortality in the 107 great towns in England and Wales increased from 12.8 per thousand for the week ended December 27, 1930, to 17.2 per thousand for the week ended January 17, 1931.

TYPHUS FEVER

A VIRUS OF THE TYPHUS TYPE DERIVED FROM FLEAS COLLECTED FROM WILD RATS

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The suggestion that some vector other than the body louse may be responsible for the transmission of the endemic typhus of the United States has been made by Brill (1), Allan (2), and Maxcy (3). The association of cases of a mild type of typhus with the handling of foodstuffs in Australia was noted by Hone (4) and in the United States by Maxcy (3). Wheatland (5) observed Australian cases apparently associated with mice. Fleas have been suggested as possible vectors by Maxcy, who also suggested the existence of a rodent reservoir (3).

In connection with our epidemiological investigation of cases of typhus it was found that several cases of endemic typhus had occurred on premises in the immediate vicinity of food handling establishments in Baltimore in the late summer and fall of 1930. On these premises evidence of heavy infestation with rats was observed. Rats were trapped at this place and combed for fleas. A rat nest was also found. Approximately 3 dozen fleas were secured from the rats and the nest on November 20, 1930. Twenty-four of these fleas were ground up in 4 cubic centimeters of normal saline, and 2 cubic centimeters of the resulting emulsion were injected intraperitoneally into each of two male guinea pigs. The remaining fleas were identified as *Ceratophyllus fasciatus* and *Xenopsylla cheopis*.

One of the guinea pigs injected with the suspension of ground fleas developed a febrile reaction seven days after inoculation and died six days later. The second animal developed a febrile reaction 12 days after inoculation. On the second day of fever this guinea pig was killed, the brain was removed and emulsified in 20 cubic centimeters of normal saline, and 2 cubic centimeters of this emulsion were injected into each of two fresh guinea pigs. One of them died after six days without having shown a febrile reaction. The second animal developed a fever eight days after inoculation. This animal was killed on the third day of fever and transfers were made to four fresh guinea pigs, heart blood and brain emulsion being used. One of these guinea pigs developed a febrile reaction five days after inoculation and also showed redness and swelling of the scrotum. This guinea pig was killed and transfers were made to fresh guinea pigs, using heart blood, brain emulsion, and testicular

washings. (In preparing the testicular washings for injection, the testicles were removed and washed in normal saline.) Since that time this strain has been carried for seven generations in guinea pigs, with the majority of the animals in each generation showing scrotal redness and swelling.

The course of the febrile reaction, the scrotal involvement, and the appearance at autopsy noted in these guinea pigs have corresponded to that noted by Maxcy for the Wilmington strain of endemic typhus virus (6).

Smears made from the tunica vaginalis and stained with Giemsa's stain have been made from 19 of these guinea pigs. Bodies similar to those described by Mooser (7) have been noted in three instances.

The brains from six guinea pigs taken approximately ten days after the onset of fever were examined histologically by Passed Assist. Surg. R. D. Lillie, who summarized the findings as follows:

FINDINGS

Guinea pig No.—

848. Lesions found are those seen in guinea pig typhus.
1073. Inconclusive for or against typhus.
1075. No evidence of typhus.
1100. No evidence of typhus.
1128. Probably typhus.
1151. Consistent with, but not definitely diagnostic of, typhus.

Two monkeys (*Macacus rhesus*) were bled and the blood sera tested for agglutinins for *proteus* X_{19} (type O). Both of these sera showed a partial agglutination of *proteus* X_{19} in the 1:40 dilution. These monkeys were then inoculated intraperitoneally with testicular washings from a guinea pig in the fifth generation from the flea. At the end of 12 days the agglutination titer of the serum from one of the monkeys had increased to complete in the 1:320 dilution while the second showed complete agglutination in the 1:160 dilution, and partial in 1:320 and in 1:640.

A febrile reaction began in both monkeys within two days after inoculation and continued six days in one instance and nine days in the other. Since a third uninoculated monkey kept in the same room ran a similar temperature, it is possible that the febrile reaction in the two inoculated monkeys may not have been specific. The uninoculated monkey did not show agglutinins for *proteus* X_{19} when tested 14 days after the other two monkeys had been inoculated. The temperature records of the two inoculated monkeys and one uninoculated monkey are shown in Table 1.

TABLE 1.—*Temperature records of two monkeys (Macacus rhesus) inoculated with a virus recovered from fleas and of an uninoculated monkey*

Day	Monkeys inoculated with virus on day 1				Uninoculated monkey, No. 309	
	No. 379		No. 380			
	a. m.	p. m.	a. m.	p. m.	a. m.	p. m.
1	39.2	[1] 38.6	39.0	[1] 39.0	39.6	39.4
2	39.1	39.3	38.6	39.4	39.5	39.4
3	39.1	39.7	39.4	40.1	39.1	39.6
4	40.8	41.1	40.8	40.9	39.1	40.0
5	------	[1] 40.5	39.4	[1] 40.2	40.8	41.0
6	40.1	40.6	39.4	39.8	40.1	40.3
8	40.3	40.9	40.1	40.7	40.0	40.2
9	40.5	[1] 40.0	39.0	[1] 39.8	39.8	39.9
10	40.3	40.4	38.8	39.2	39.6	39.4
11	39.8	41.3	39.0	39.5	39.2	39.4
12	39.5	41.0	39.3	39.5	38.8	38.8
13	39.0	[1] 39.3	------	[1] 39.6	------	39.2
15	38.8	39.7	39.2	39.4	39.0	[1] 39.1
16	38.8	38.7	39.1	39.4	39.3	39.4

[1] Blood serum tested for Weil-Felix reaction.

Six fresh rabbits were bled and their sera tested for agglutinins for *proteus* X_{19} (type O). One of these sera showed partial agglutination in 1:20, three showed partial agglutination in 1:10, and two sera were negative in all dilutions.

Three of these rabbits were inoculated with testicular washings from a guinea pig infected with virus in the sixth generation removed from the fleas and gave Weil-Felix reactions two weeks after inoculation as follows: One rabbit gave complete agglutination in the 1:80 dilution and partial in 1:160, the second complete in 1:160 and partial in 1:320, and the third complete in 1:320 and partial in 1:640. Table 2 gives the agglutination reactions shown by sera from these rabbits.

TABLE 2.—*Agglutination of proteus X_{19} (type O) by rabbit sera after inoculation of rabbits with a virus recovered from fleas*

Rabbit	Day tested	Dilution							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1280
1019G	1	2	1	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	15	4	4	4	4	2	1	0	0
1019F	1	0	0	0	0	0	0	0	0
	9	4	2	1	0	0	0	0	0
	15	4	4	4	4	4	2	1	0
1019H	1	2	1	0	0	0	0	0	0
	9	3	2	0	0	0	0	0	0
	15	4	4	4	4	4	4	2	0

The remaining three rabbits were inoculated with testicular washings from a guinea pig infected with virus of the seventh generation and showed agglutinins for *proteus* X_{19} (type O) two weeks after inocu-

lation as follows: One rabbit's serum gave complete agglutination in a dilution of 1:40 and partial in 1:80, the second complete in 1:80 and partial in 1:160 and in 1:320, while the third showed complete agglutination in 1:320 and partial in 1:640. Table 3 gives the agglutination reactions shown by the sera from these rabbits.

TABLE 3.—*Agglutination of proteus X_{19}(type 0) by rabbit sera after inoculation of rabbits with a virus recovered from fleas*

Rabbit	Day tested	Dilution							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1280
1059D	1	3	2	1	0	0	0	0	0
	9	3	2	1	0	0	0	0	0
	15	4	4	4	2	0	0	0	0
1059C	1	0	0	0	0	0	0	0	0
	9	2	0	0	0	0	0	0	0
	15	4	4	4	4	3	2	0	0
1059E	1	2	0	0	0	0	0	0	0
	9	2	1	0	0	0	0	0	0
	15	4	4	4	4	4	4	2	1

Cross immunity tests between the flea strain and typhus strains have been hampered by the occurrence of secondary infections among the stock guinea pigs.

The results of one cross immunity test between the flea strain and New World endemic typhus virus are shown in Table 4. In this test four guinea pigs (W1501, W1509, W1518, and W1519) which had recovered from infection with the Wilmington strain of endemic typhus virus and four fresh guinea pigs (1123, 1124, 1125, and 1126) were inoculated with testicular washings from a guinea pig (1074) infected with virus of the seventh generation from the fleas.

TABLE 4.—*Temperature records of guinea pigs inoculated with endemic typhus virus (Wilmington strain) and later inoculated with a virus recovered from fleas, and records of control animals*

Day after inoculation	Guinea pigs inoculated with endemic typhus on Dec. 29 and 31			
	W1501	W1509	W1518	W1519
0	39.2	39.2	39.2	39.2
1	38.9	38.9		
2		39.0	39.6	38.5
3			39.8	39.6
4	39.7	40.0		39.6
5	[1] 39.8	40.5	[1] 40.5	[1] 40.6
6		(?)	[1] 40.1	[1] 39.6
7	[1] 39.9	[1] 39.8	[1] 40.0	[1] 39.8
8	[1] 40.1	[1] 38.9	[1] 40.2	[1] 40.0
9	[1] 40.0	[1] 39.2	40.2	40.2
10	40.0		39.7	39.8
11	39.3			
12			39.7	39.8
13			39.5	39.2

[1] Redness and swelling of scrotum.

TABLE 4.—*Temperature records of guinea pigs inoculated with endemic typhus virus (Wilmington strain) and later inoculated with a virus recovered from fleas, and records of control animals*—Continued

Day after inoculation	Guinea pigs inoculated with flea virus on Jan. 15							
	Fresh guinea pigs				Immune guinea pigs			
	1123	1124	1125	1126	W1501	W1509	W1518	W1519
0	39.4	38.7	38.8	39.3				
1	39.0	39.1	38.4	39.2	38.8	39.4	38.8	38.4
2	39.0	39.2	38.9	39.4	39.3	39.5	39.2	38.8
3	39.0	39.0	40.3	39.2	38.3	39.1	38.8	38.1
4	39.6	[1] 39.9	[1] 39.4	39.3	38.8	39.0	38.7	38.8
5	39.8	[1] 39.6	[1] 40.4	40.5	39.0	39.3	39.4	39.0
6	[1] 40.5	[1] 40.0	[1] 40.4	[1] 40.0	39.1	39.2	39.1	39.5
7	[1] 39.7	[2]	39.3	[1] 39.4	38.7	39.1	39.1	39.4
8	[2]		39.5	39.5	38.4	38.9	39.0	39.3
9			39.2		38.6	39.0	38.8	40.0
10				39.7	39.1	39.2	39.5	40.1
11			38.9	40.0	39.0	39.3	40.5	39.6
12			39.1	35.0	39.0	39.0	39.5	39.4
13			39.4	[3]	38.7	38.6	39.6	39.6
14			38.5		38.0	38.5	39.8	39.2
15			38.5		38.4	38.5	39.0	38.9
16			38.8		39.6	38.8	39.8	39.4
17			39.0		39.6	40.3	39.2	39.7
18			38.5		39.9	39.5	39.5	

[1] Redness and swelling of scrotum.
[2] Killed for transfer.
[3] Dead; undetermined cause.

In two instances fleas taken from rats caught at a second location in Baltimore where typhus fever had occurred have been ground up and injected into guinea pigs. As a result, two additional strains of virus have been established which, in temperature reactions and scrotal lesions, resemble closely the strain first established from fleas.

SUMMARY

Inoculation into guinea pigs of fleas removed from rats which had been trapped at a typhus focus resulted in the establishment of a strain of virus which produced a typhus-like reaction in guinea pigs. Monkeys and rabbits developed agglutinins for *B. proteus* X_{19} (type O) following inoculation with this strain of virus. Guinea pigs which had recovered from an attack of endemic typhus produced by the Wilmington strain of virus were apparently immune to a subsequent inoculation with the strain of virus recovered from the fleas.

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THE INFLUENCE OF ARSENICALS AND CRYSTALLINE GLUTATHIONE ON THE OXYGEN CONSUMPTION OF TISSUES

By Carl Voegtlin, *Chief of Division of Pharmacology*, Sanford M. Rosenthal, *Pharmacologist*, and J. M. Johnson, *Chemist, National Institute of Health, United States Public Health Service.*

The purpose of this paper is to describe experiments designed to increase our knowledge of the chemical mechanism involved in the pharmacological action of arsenicals, and to contribute some new observations concerning the fundamental aspects of the utilization of oxygen by tissues. Rosenthal and Voegtlin (1930) recently have shown that crystalline SH glutathione has a protective action in rats, rabbits, and trypanosomes against the toxic influence of arsenious oxides. Previous work from this laboratory (Voegtlin, Dyer, and Leonard, 1923) had indicated that this action is more or less specific for certain sulphydril compounds and is not shown by the other tissue constituents so far examined. Rosenthal and Voegtlin furthermore found that the rate of oxidation of crystalline SH glutathione by molecular oxygen in the presence of a trace of hemin is considerably decreased by arsenious oxides. These and other findings which will not be mentioned were regarded as confirmation of our hypothesis that the action of arsenious oxides on living cells involves a chemical reaction with SH glutathione and possibly other SH compounds of protoplasm.

It has been known for some time that arsenious acid when added in relatively low concentrations to certain living cell-suspensions causes a marked decrease in their oxygen consumption (Onaka, 1911; Dresel, 1926). Warburg therefore regards arsenic, besides H_2S, HCN, and CO, as specific poisons of the "respiratory ferment," which, on the basis of his recent important studies, he considers as an iron containing compound chemically related to hemin.

After having clearly demonstrated the antagonistic function of SH glutathione on the arsenic action by means of various toxicity experiments, it was therefore important to determine whether or not SH glutathione is able to maintain the normal rate of oxygen consumption of tissues exposed to concentrations of arsenious oxides which as such cause a marked decrease in oxygen consumption. In view of the considerable quantitative and qualitative differences in the pharmacological action of various types of arsenicals, as revealed especially by the work of Voegtlin and Smith (1920), preliminary experiments were carried out to determine the effect on the oxgyen consumption of tissues of some of the theoretically and therapeutically most important types of arsenicals.

METHODS AND MATERIALS USED

The oxygen consumption was measured in Warburg vessels with Haldane-Barcroft manometers, using the technique described by Warburg and his collaborators (1926). The vessels were provided with a side arm, which permitted the addition of the solution of chemicals to the tissue during the course of the experiments. Air was used as a source of oxygen, and the CO_2 produced was absorbed by 5 per cent of NaOH placed in the special compartment of the respiration vessel. The following normal tissues of rats were employed: Liver, kidney, and testis. The animals were killed by decapitation, after which the tissues were rapidly removed and cut into small pieces, and weighed portions were introduced into the respiratory chambers. The weights of tissue given in the graphs of this paper are always expressed in terms of fresh weight.[1] The testicular tissue yielded a particularly even cellular suspension, which on microscopic examination revealed very little cell débris and a large number of normally appearing cells. For this reason the testis was used more often than the other tissues. The tissues were suspended in Locke solution containing 0.2 per cent glucose.[2] In some of the experiments the glucose was left out, as indicated in the detailed description of each series of experiments. These normal tissues were shown by Warburg to possess under aerobic conditions essentially an oxidative metabolism uncomplicated by aerobic glycolysis. It was of further interest to study the behavior of a malignant tissue, which exhibits a relatively high aerobic glycolysis. The Jensen rat sarcoma was used for this purpose, care being taken to select portions of small tumors showing no macroscopic necrosis. Locke's solution was also used in this case. Finally experiments were also made with baker's yeast suspended in phosphate buffer. The temperature of the water bath was always 37.6° C.

The crystalline SH glutathione was prepared by the method of Hopkins (1929), the crystals in some preparations being separated from the mother liquor by means of glacial acetic acid, according to Kendall (1929). This treatment should remove any minute traces of impurities, as iron, cysteine, etc. The S-S glutathione was prepared from the crystalline material by running at room temperature a stream of oxygen through a concentrated solution, neutralized with $Ba(OH)_2$, until the nitroprussid reaction became negative. After immediate and careful removal of the barium by H_2SO_4 the solution was rapidly concentrated *in vacuo*, precipitated with absolute alcohol, and dried to constant weight. Analysis showed 10.59 per cent S and 13.10 per cent N, indicating, as Hopkins had found previously,

[1] In the case of the testis the uniform suspension obtained by the addition of Locke solution to a weighed amount of tissue, was measured by means of a pipette.

[2] Locke solution used: 9.2 g. NaCl, 0.042 g. KCl, 0.18 g. $CaCl_2$, 0.15 g. $NaHCO_3$, and 1,000 cc. H_2O.

that the substance had undergone partial decomposition. It can be assumed, however, that a considerable part of the material represents S-S glutathione. At all events the substance did not contain sulphur in the reduced (SH) form.

The neoarsphenamine and sulpharsphenamine were commercial products, having passed the official requirements. Arsenoxide, i. e., the hydrochloride of 3-amino-4-hydroxyphenyl arsenious oxide, was prepared by the method of Ehrlich and Bertheim (1912). It contained 31.62 per cent As, all of which was trivalent, as shown by iodine titration. The 3-amino-4-hydroxyphenylarsonic acid was obtained by the method described in the same publication. It was repeatedly recrystallized and was chemically pure. The 4-hydroxyphenylarsonic acid was made according to Barrowcliff, Pyman, and Remfry (1908), and part of the substance was converted into 4-hydroxyphenylarsenious oxide according to D. R. P. 213594. Tryparsamide, i. e., N-(Phenyl-4-arsonic acid), glycineamide, was used as a crystalline chemically pure compound. Arsenious and arsenic acids were of high purity. The solutions of these chemicals were always carefully neutralized, thus avoiding a shift in the pH of the Locke solution and phosphate buffer. The concentration of the solutions is given in terms of normality with respect to arsenic in case of the arsenicals, with respect to S in case of glutathione, and with respect to Fe in the case of Mohr's salt.

RESULTS

Differences in action of different arsenicals.—These are clearly brought out by Figures 1, 2, and 3. All of the pentavalent arsenicals, i. e., arsenate, tryparsamide, 3-amino-4-hydroxyphenylarsonic acid, and 4-hydroxyphenylarsonic acid, exert either no influence on the O_2 consumption or produce only a moderate inhibition. Of the arsphenamines, sulpharsphenamine (Fig. 3), during the later part of the experiment, slightly decreased the rate of O_2 uptake, whereas in another experiment there was no difference as compared with the control at the end of the experiment. Neoarsphenamine, probably due to its ready oxidation in slightly alkaline media, markedly decreased the O_2 consumption of the tissue. The decrease is much more pronounced with arsenoxide. This influence of arsenoxide is shown in all experiments on normal tissues, the Jensen sarcoma, and yeast, indicating that the substance has a potent action on cells of widely different origin. 4-hydroxyphenyl arsenious oxide has the highest potency of these arsenicals.

These results on the influence of arsenicals on the O_2 consumption of tissues are of interest in relation to their pharmacological action as studied by Voegtlin and Smith (1920). These investigators arrived at the conclusion that arsenious oxides (R.AsO) are to be re-

garded as the directly acting form of arsenic, and that the arsphenamines (R.As=As.R.) and the pentavalent compounds ($R.AsO_3H_2$)

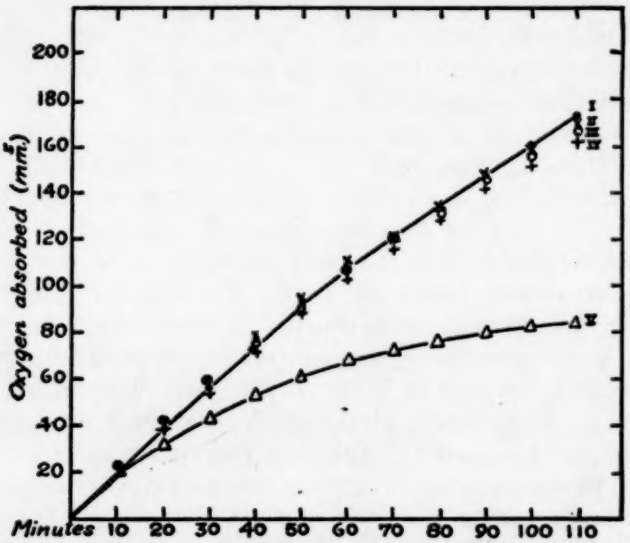


FIGURE 1.—0.3 g. testis in Locke solution without glucose. All arsenicals added at beginning of experiment. I=testis; II=testis+N/1000 arsenate; III=testis+N/1000 3-amino-4-hydroxyphenylarsonic acid; IV=testis+N/1000 tryparsamide; V=testis+N/1000 3-amino-4-hydroxyphenylarsenious oxide

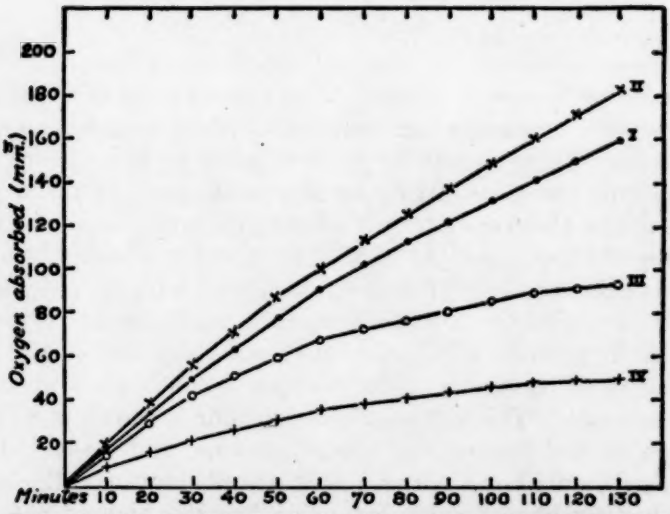


FIGURE 2.—0.3 g. testis in Locke solution without glucose. All arsenicals added at beginning of experiment. I=testis; II=testis+N/1000 4-hydroxyphenylarsonic acid; III=testis+N/1000 3-amino-4-hydroxyphenylarsenious oxide; IV=testis+N/1000 4-hydroxyphenylarsenious oxide

have to be converted by the animal body by partial oxidation or reduction respectively into the really active R.AsO modification. It

is obvious that this biochemical transformation requires time, a fact which evidenced itself by the latent periods of several hours in the trypanocidal action and the time of appearance of toxic symptoms in the host animal. It should be pointed out that the duration of the O_2 consumption experiments is relatively short, about two hours. This is evidently insufficient time for the tissue to reduce under prevailing conditions enough of the pentavalent arsenicals and there is consequently little or no effect on the O_2 uptake.[3] Chemical evidence shows that sulpharsphenamine is more resistant to oxidation than

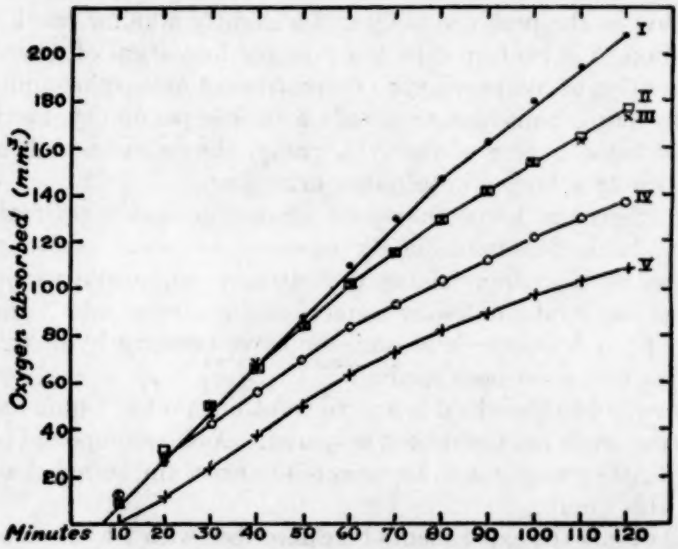


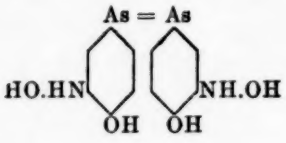
FIGURE 3.—0.3 g. testis in Locke solution. All arsenicals added at beginning of experiment. I=testis; II=testis+N/1000 4-hydroxyphenylarsonic acid; III=testis+N/1000 sulpharsphenamine; IV=testis+N/1000 neoarsphenamine; V=testis+N/1000 3-amino-4-hydroxyphenylarsenious oxide

neoarsphenamine. This again is consistent with the more pronounced effect of neoarsphenamine on the O_2 consumption.

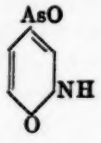
With reference to the great reduction in O_2 uptake produced by 4-hydroxyphenylarsenious oxide it should be pointed out that this result contradicts the suggestion of Mayer (1926) that about 90 per cent of the toxicity and possibly the chemotherapeutic action of the arsphenamines is due to chemical transformations in the ortho-aminophenol grouping. Mayer assumes, without proving it, that the NH_2 group is converted into a substituted hydroxylamine (A)

[3] Relatively low concentrations (N/1000) of these arsenicals were used. It is possible that higher concentrations, due to chemical mass action, might show more pronounced effects.

or that 3, 4-quinoneimine 1-arsenious oxide (B) is formed. Case A



(A)



(B)

is theoretically possible with arsphenamine, but Voegtlin and Smith (1920), by means of chemical as well as biological evidence, have shown that in the presence of O_2 and a slightly alkaline reaction the arseno linkage is broken with the primary formation of arsenoxide. The formation of hydroxylamine derivatives of neoarsphenamine and especially sulpharsphenamine is only a remote possibility, in view of the substituted nature of the NH_2 group, the substituent being especially firmly attached in sulpharspheñamine.

We furthermore know that pure arsenoxide exerts its toxic and trypanocidal action immediately (absence of latent period). The formation of a hydroxylamine derivative is an oxidative process. Mildly acting oxidants finally convert arsphenamine into 3-amino-4-hydroxylphenyl arsonic acid and the corresponding hydroxylamine derivative has never been made.

With regard to Case B, it is well to point out that 3, 4-quinoneimine 1-arsenious oxide has never been prepared. As this compound belongs to the R.AsO group it is to be expected to exert the action characteristic of this group.

At all events the experiments here described with 4-hydroxyphenylarsenious oxide, *containing no amino group*, which could form hydroxylamine or quinoneimine, clearly indicate that Mayer's suggestion has not much in its favor. He is evidently not aware of the fact that Ehrlich (1909) found this substance about equally effective in trypanocidal action as the corresponding NH_2 compound and that 4-hydroxyphenyl arsonic acid and 4, 4′ hydroxy-arsenobenzene are effective chemotherapeutic agents.

Antagonistic action of SH glutathione.—From the preceding results it was obvious that the arsenious oxides would offer the best opportunity to study the antagonistic action of SH glutathione. The experiments were therefore carried out with arsenoxide, 4-hydroxyphenylarsenious oxide, and arsenious acid in such concentrations as to produce a pronounced reduction in O_2 uptake of the tissues and yeast cell suspensions. In the preceding work on the protective action of SH glutathione on arsenoxide toxicity it was found that about 10 moles of SH glutathione was required to overcome the effect of 1 mole of arsenoxide. This ratio was therefore adopted for the present series of experiments. For each of these two proper

controls, tissue plus glutathione and tissue plus arsenic were run. The glutathione was added to the tissue simultaneously with the arsenic or after a varying interval.

Figures 4 to 8 illustrate the results obtained with testis, liver, kidney, and sarcoma. Exposure of these tissues to high concentrations (N/100) of glutathione caused no appreciable effect on the rate of O_2 consumption in the case of testis, liver, and sarcoma. The supernatant Locke solution at the end of the experiments gave a strong nitroprussid test, which indicates that at least part, if not all, of the SH glutathione has escaped oxidation. When the same solution of SH glutathione is added to kidney tissue (Fig. 7), the O_2 consumption is increased, and the nitroprussid test of the supernatant fluid at the end of the experiment is negative or faint. The extra O_2 uptake with kidney tissue in presence of glutathione can be accounted for by the volume of O_2 required to convert the SH to the S-S glutathione. The O_2 consumption of yeast in presence of glutathione is also increased within the limits of O_2 required for the oxidation of glutathione. We conclude, therefore, that *crystalline glutathione of high purity does not under the prevailing conditions exert a catalytic influence on the* O_2 *consumption* of these tissues and yeast. This question will be subjected to more detailed analysis in a subsequent paper.

The striking effect of SH glutathione in overcoming the diminution in O_2 uptake resulting from exposure of the tissues to arsenoxide or 4-hydroxyphenylarsenious oxide is clearly shown in Figures 4 to 9. In Figure 4, for instance, the rate of O_2 consumption of testis plus arsenoxide plus SH glutathione is the same as that of the tissue alone. This protective action of glutathione is still operative if this substance is added to the tissue 1, 5, or 15 minutes *after* the addition of arsenic and before the measurements were begun. A moderate increase in O_2 uptake was even observed (fig. 8), when 50 minutes intervened between the addition of arsenic and glutathione. A similar situation obtains in the experiment with yeast illustrated by Figure 9, which shows that the 26 per cent reduction in O_2 uptake produced by arsenoxide alone at the end of the experiment is cut to 5 per cent when the SH glutathione is added at the same time as the arsenic. The glutathione is less effective when an interval of 35 minutes intervenes between arsenic and glutathione addition.

Incidentally it should be mentioned that experiments with yeast showed that variation in the pH of the buffer used has a pronounced effect on the reduction of O_2 uptake caused by arsenoxide. As compared with yeast in the same buffer, the O_2 uptake in the presence of N/1000 arsenoxide was as follows: 78 per cent at pH 6.46, 93 per cent at pH 7.14, and 74 per cent at pH 7.84. These results are in harmony with the amphoteric character of arsenoxide and its low

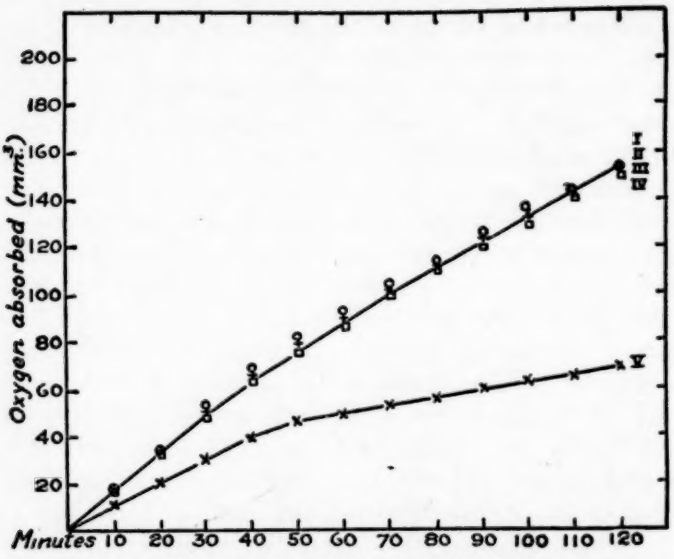


FIGURE 4.—0.3 g. testis in Locke solution. I=testis+N/100 SH glutathione; II=testis+N/1000 arsenoxide+N/100 SH glutathione added 1 minute after arsenoxide; III=testis+N/1000 arsenoxide+N/100 SH glutathione added 5 minutes after arsenoxide; IV=testis+N/1000 arsenoxide+N/100 SH glutathione added 15 minutes after arsenoxide; V=testis+N/1000 arsenoxide

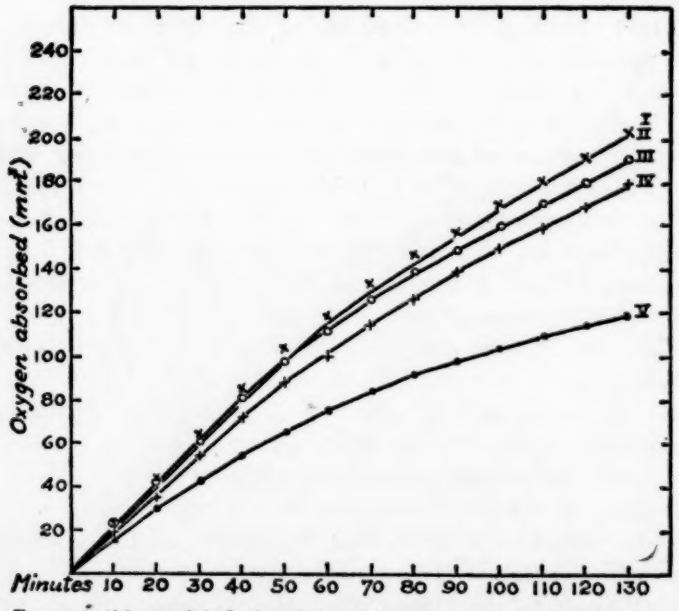


FIGURE 5.—0.3 g. testis in Locke solution without glucose. I=testis; II=testis+N/100 SH glutathione; III=testis+N/2000 4-hydroxyphenylarsenious oxide+N/100 SH glutathione; IV=testis+N/2000 4-hydroxyphenylarsenious oxide+N/200 SH glutathione; V=testis+N/2000 4-hydroxyphenylarsenious oxide

solubility at pH 7 and all experiments with this substance must, therefore, be carried out in a slightly acid or akaline medium.

In fact it is well to consider the solubility factor in all experiments dealing with the influence of chemicals on the metabolism of tissues by means of the Warburg technic. We believe that this factor, at least, partly accounts for the somewhat different results obtained with arsenious acid which will now be considered. Rosenthal and Voegtlin (1930) showed that the protective action of SH glutathione in rats and trypanosomes exposed to lethal concentrations of sodium

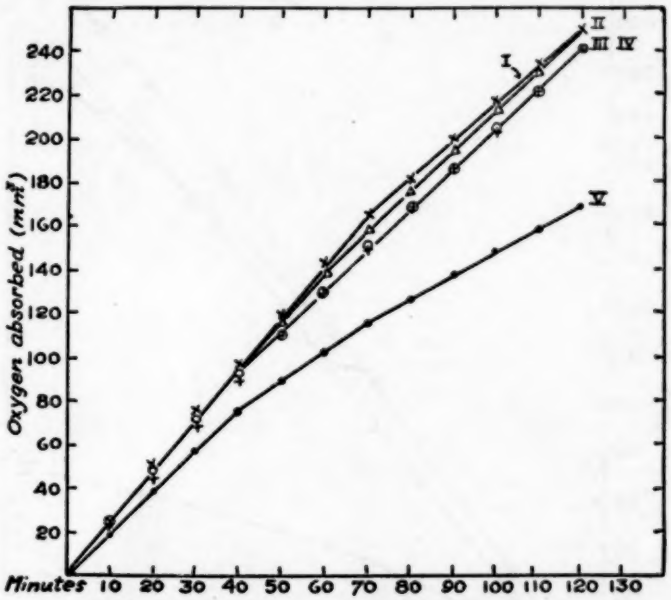


FIGURE 6.—0.3 g. liver in Locke solution. All chemicals added at beginning of experiment except in Case IV. I=liver; II=liver+N/100 SH glutathione; III=liver+N/100 SH glutathione+N/1000 arsenoxide; IV=liver+N/1000 arsenoxide+N/100 SH glutathione added 15 minutes after arsenoxide; V=liver+N/1000 arsenoxide

arsenite requires 40 moles of glutathione for each atom of arsenic, i. e., approximately four times as much glutathione as in the case of arsenoxide. The experiment (fig. 10) with testis indicates that if SH glutathione is used in this ratio (40:1) with respect to arsenite, the substance exerts a marked action on the O_2 consumption, as compared with the arsenic control. With a ratio of 20 to 1 the glutathione effect was less marked, and with 10 to 1 it was entirely absent. Further experiments with kidney and yeast, using a ratio of 10 to 1, were also negative.

No attempt was made to study the influence of a 40 to 1 ratio on kidney and yeast because in the presence of these cells glutathione oxidizes more or less rapidly, whereas in the presence of testicular

tissue the added glutathione largely remains in the reduced form. For this reason the testis is more suitable for these studies.

The next question was to determine if, according to our theory, the action of SH glutathione is due to its SH group. Figures 11 and 12 illustrate these experiments and show conclusively that the addition of S-S glutathione has no influence on the O_2 uptake of these tissues and that it is unable to overcome the great reduction in the O_2 consumption caused by arsenoxide. We conclude, therefore, that the

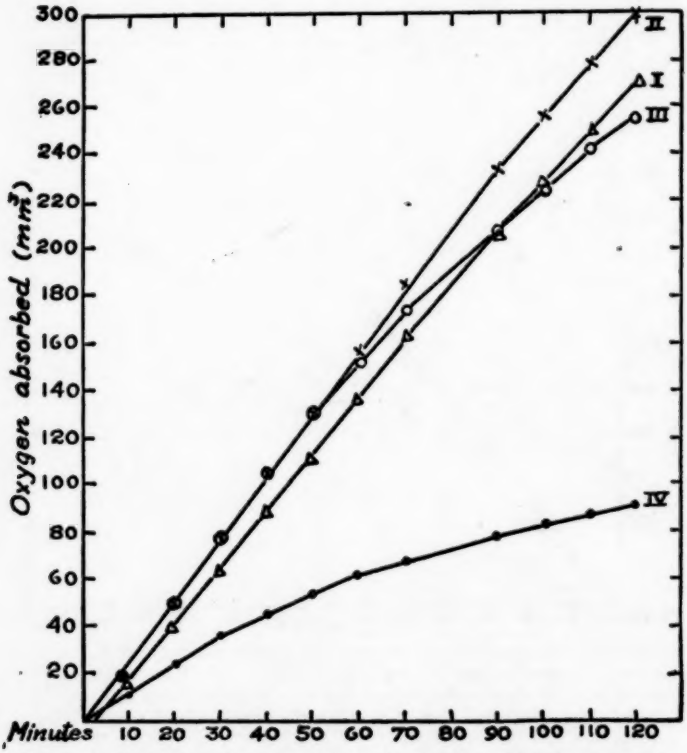


FIGURE 7.—0.1 g. kidney in Locke solution. All chemicals added at beginning of experiment. I=kidney; II=kidney+N/300 SH glutathione; III=kidney+N/3000 arsenoxide+N/300 SH glutathione; IV=kidney+N/3000 arsenoxide

effectiveness of SH glutathione is essentially due to its SH group with its chemical affinity for arsenious oxides, which may be expressed by the equation

$$R\,AsO + 2\,R.SH \rightleftharpoons R.As(SR)_2 + H_2O.$$

On chemical grounds a glutathione derivative of arsenious oxide $\left(R.As\begin{matrix}SR\\SR\end{matrix}\right)$ should reduce the O_2 uptake of tissues much less than the equivalent amount of arsenious oxide alone. Unfortunately we are not in a position to test the correctness of this assumption, as we have

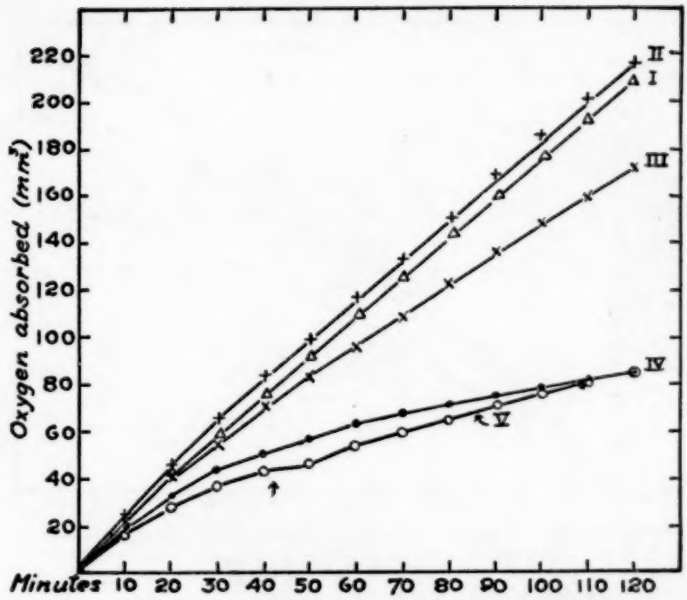


FIGURE 8.—0.185 g. Jensen sarcoma in Locke solution. All chemicals added at beginning of experiment except in Case V. I=sarcoma; II=sarcoma+N/100 SH glutathione; III=sarcoma+N/1000 arsenoxide+N/100 SH glutathione; IV=sarcoma+N/1000 arsenoxide; V=sarcoma+N/1000 arsenoxide+N/100 SH glutathione added 50 minutes after arsenoxide

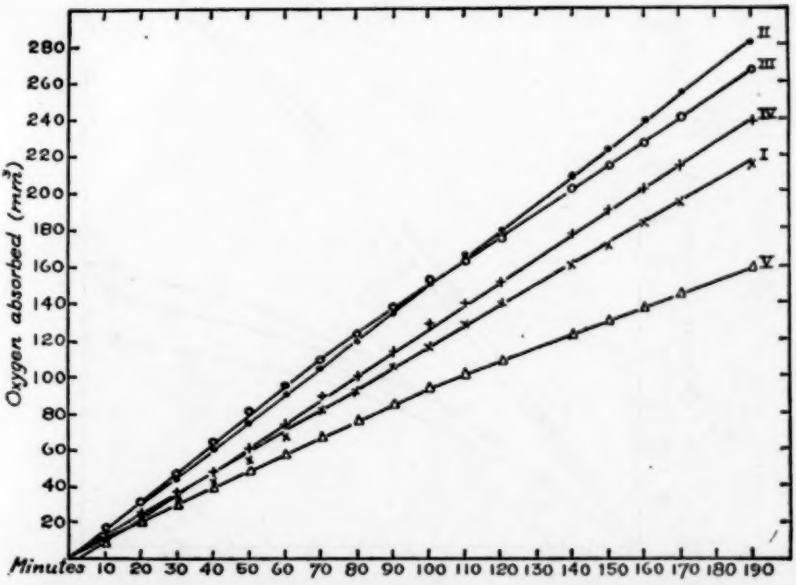


FIGURE 9.—4 mg. baker's yeast in phosphate buffer (pH 7.84) containing 0.2 per cent glucose. All respiration vessels contain M/20000 hemin. I=yeast; II=yeast+N/100 SH glutathione; III=yeast+N/1000 arsenoxide+N/100 SH glutathione; IV=yeast+N/1000 arsenoxide+N/100 SH glutathione added 35 minutes after arsenoxide; V=yeast+N/1000 arsenoxide

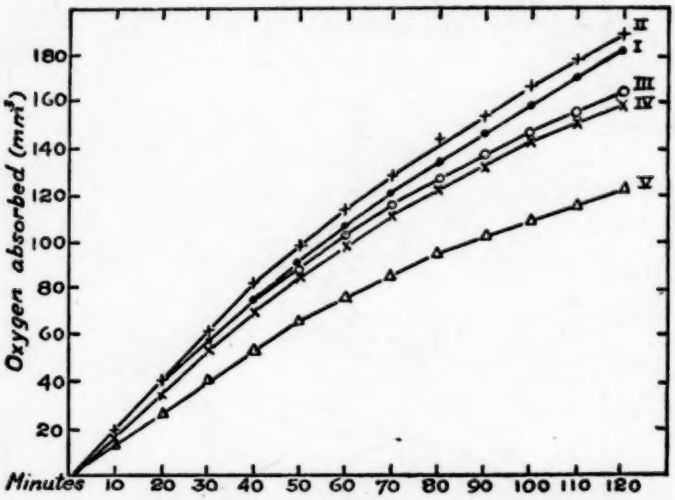


FIGURE 10.—0.3 g. testis in Locke solution without glucose. I=testis; II=testis+N/100 SH glutathione; III=testis+N/100 SH glutathione+N/4000 arsenite; IV=testis+N/4000 arsenite+N/100 SH glutathione added 5 minutes after arsenite; V=testis+N/4000 arsenite

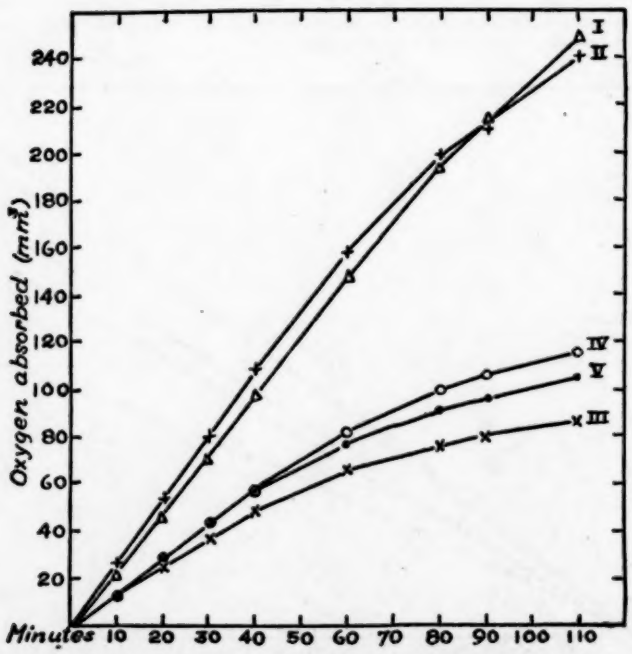


FIGURE 11.—0.3 g. testis in Locke solution. I=testis; II=testis+N/100 S–S glutathione; III=testis+N/100 S–S glutathione+N/1000 arsenoxide; IV=testis+N/1000 arsenoxide+N/100 S–S glutathione added 15 minutes after arsenoxide; V=testis+N/1000 arsenoxide

not yet been able to separate the arsenic-glutathione in pure form. Experiments with testis and tricysteinylarsine (Johnson and Voegtlin, 1930) indicate that this compound shows the same reduction in O_2 consumption as the equivalent amount of arsenious acid. This is probably due in part to a difference in the biological action of cysteine as compared with SH glutathione and partly to the dissociation of the cysteinylarsine with the liberation of arsenious acid.

In view of Warburg's theory, which assumes that the arsenic effect on the O_2 uptake of living cells is due to a specific chemical combina-

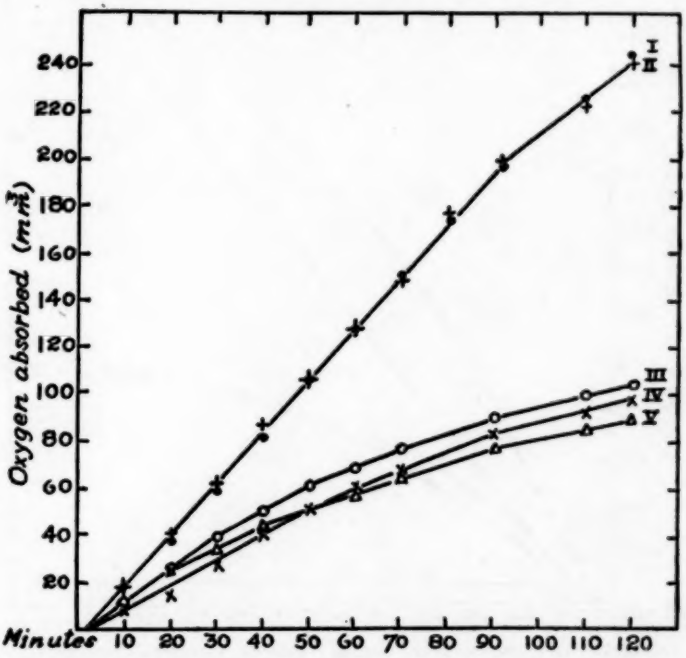


FIGURE 12.—0.1 g. kidney in Locke solution. I=kidney; II=kidney+N/300 S-S glutathione; III=kidney+N/300 S-S glutathione+N/3000 arsenoxide; IV=kidney+N/3000 arsenoxide+N/300 S-S glutathione added 15 minutes after arsenoxide; V=kidney+N/3000 arsenoxide

tion with the iron of the respiratory ferment, it was important to determine if iron compounds, as well as SH glutathione, could overcome the arsenic action on tissues. Figure 13 illustrates the negative outcome of such an experiment in which iron was used as Mohr's salt (ferrous ammonium sulphate). This negative result in itself is of course insufficient to reject Warburg's idea of the arsenic action, as this would require experiments in which the pure iron containing respiratory ferment is used in place of Mohr's salt. Such experiments are impossible at present, as the respiratory ferment has not been isolated. We are forced to conclude, therefore, that the positive evidence obtained in this and previous investigations strongly indicates that the pharma-

cological action of arsenious oxides on protoplasm involves a chemical reaction between arsenic and the SH glutathione of tissues.

The observations reported in this paper, besides being of pharmacological interest, have some bearing on that fundamental physiological and inadequately understood problem of the nature of the chemical substances primarily involved in the utilization of oxygen by tissues. The catalytic mechanism responsible for the activation of

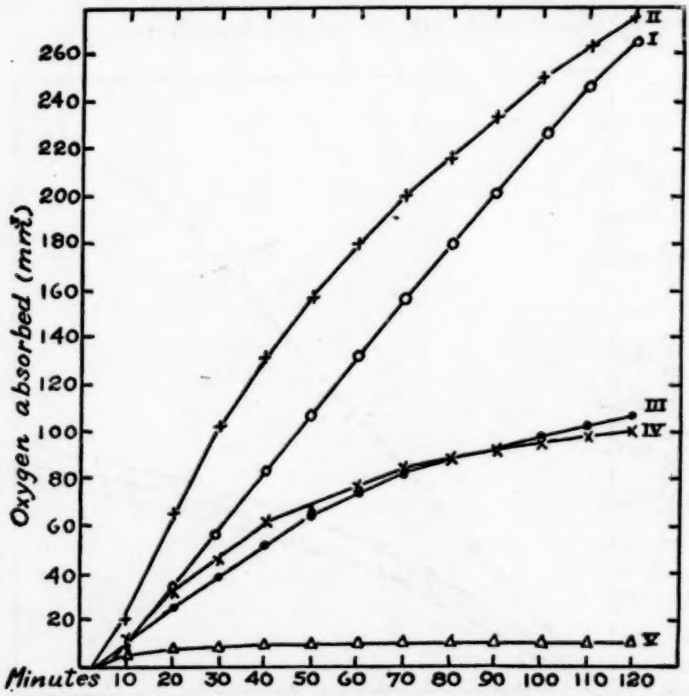


FIGURE 13.—0.3 g. testis in Locke solution. I=testis; II=testis+N/1000 $FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$ (Mohr's salt); III=testis+N/1000 arsenoxide; IV=testis+N/1000 Mohr's salt+N/1000 arsenoxide; V=N/1000 Mohr's salt in Locke solution. The total O_2 uptake of Mohr's salt as shown in Curve V is considerably below the value as calculated on the basis of a complete conversion into the ferric state. This is due to the fact that oxidation was proceeding for some time before the readings were begun. In Curve II the rate of O_2 uptake during the first 30 minutes is considerably greater than in the control (Curve I). We can not definitely decide whether this indicates an actual catalytic effect of Mohr's salt on the O_2 uptake of the tissue

oxygen, as postulated by Warburg, probably is the primary chemical mechanism in the utilization of oxygen by tissues. But in view of the complexity of the chemical composition of cells it is quite possible that this catalytic mechanism may be influenced and controlled by other cellular constituents, as for instance glutathione, and that therefore this substance and other sulphydril compounds are concerned in cell respiration. The fact that the rate of O_2 consumption of tissues which has been greatly reduced by arsenoxide can be

restored to normal by the addition of SH glutathione is the first evidence that glutathione can influence the O_2 consumption of living tissues. The absence of any effect on respiratory rate from the addition of glutathione to tissues in the absence of arsenic is not necessarily inconsistent with this view. For it is conceivable that normal tissues may already contain glutathione in excess of the amount which can be utilized, so that further additions are ineffective in stimulating the O_2 consumption. The possibility that arsenic may act upon some other cellular constituent besides SH compounds is not supported by any evidence.

CONCLUSIONS

1. The addition of crystalline SH glutathione to kidney, liver, testis, the Jensen rat sarcoma, and baker's yeast does not increase the rate of O_2 consumption beyond the extra amount of O_2 required to oxidize the sulphur of the added glutathione. Oxidized glutathione has no accelerating influence on the O_2 consumption of kidney and testis.

2. Arsenious oxides (R.As.O) in relatively low concentrations cause a pronounced reduction in the rate of O_2 consumption. The pentavalent arsenicals ($R.AsO_3H_2$), including tryparsamide, in the same concentrations are devoid of any influence on the O_2 consumption. Of the arsenobenzene derivatives (R.As=As.R) sulpharsphenamine is ineffective, whereas neoarsphenamine due to its rapid oxidation reduces the O_2 consumption, but less markedly than arsenoxide. These results are in harmony with observations concerning the pharmacological and chemotherapeutic properties of these compounds, which distinguish the three groups, R.AsO, $R.AsO_3H_2$, and R.As=As.R.

3. SH glutathione when added to tissues in the ratio of 10 moles to 1 mole of arsenoxide prevents the reduction in O_2 consumption caused by arsenoxide alone. S–S glutathione is ineffective, showing that the action of SH glutathione is due to its SH group.

4. Ferrous ammonium sulphate is ineffective in overcoming the reduction in O_2 consumption produced by arsenoxide.

5. These observations add further evidence in favor of the theory that the pharmacological action of these arsenicals is essentially due to a chemical reaction with SH glutathione and possibly other SH compounds of protoplasm.

From the physiological viewpoint the results appear to indicate that glutathione in some as yet unexplained manner is concerned in the O_2 consumption of tissues *in vitro*.

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COURT DECISION RELATING TO PUBLIC HEALTH

Payment for services as local registrar of vital statistics denied.—(Louisiana Court of Appeal; Fox *v.* City of Monroe, 131 So. 483; decided Dec. 23, 1930.) In 1920 the plaintiff was appointed registrar of vital statistics for Ouachita Parish, which includes the city of Monroe. At the same time he was employed by the city of Monroe as secretary of the city board of health and city sanitary officer at a stipulated monthly salary. By statute the plaintiff was entitled, as compensation for his services as registrar, to a fee of 25 cents for each birth and each death reported, to be paid by the police jury of the municipality upon the warrant of the president and secretary of the State board of health. From 1920 to 1929, 28 warrants, aggregating $1,744.50, were drawn by the State board of health on the treasurer of the city of Monroe in favor of the plaintiff. None of these warrants for plaintiff's services in reporting births and deaths occurring in the city was paid by the city, and in 1929, after resigning his position with the city, he filed suit to collect them.

The city's defense was that during the said nine years the plaintiff had been employed by it as secretary of the board of health and sanitary officer, and that he had been informed that the person holding such position would be required to perform the duties of local registrar of vital statistics for the city without the payment by it of any sums other than the salary agreed upon. The plaintiff did not at any time during his employment by the city insist upon the payment of said warrants but apparently acceded to the city's demand that he do the work of the registrar for the city in connection with his other duties for which he was paid a salary. He testified that he knew if he pushed the claims for collection that he would be discharged. The judgment of the trial court in favor of the city was affirmed by the court of appeal. The latter court in its opinion said, in part.

> Plaintiff, therefore, deliberately and intentionally chose the benefit of the salary paid by the city instead of that which arose under the warrants. He

knew that he could not claim both and with full understanding of his legal rights he made his choice. He can not now, after making a deliberate choice of the greater benefit of the salary and accepting it through all those years, be permitted to enforce this stale demand against the city.

* * * * * * *

"Waiver" is a voluntary act and involves the idea of assent and intention. Plaintiff voluntarily abandoned these claims against the city during the period of his employment and acceded to the city's refusal to pay them. His intention to do so is manifest from his conduct.

He abandoned his rights under these warrants for prudential reasons. He knew if he insisted upon their payment he would lose his position, and the salary which the city was paying him. Prudence and discretion prompted the course which he took.

"Where a person refrains from asserting his rights for prudential reasons, he is entitled to less favorable consideration than if his conduct has been that of mere inaction." 10 R. C. L. 402.

DEATHS DURING WEEK ENDED JANUARY 24, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended January 24, 1931, and corresponding week of 1930. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended January 24, 1931	Corresponding week, 1930
Policies in force	75, 130, 099	75, 467, 337
Number of death claims	15, 115	14, 091
Death claims per 1,000 policies in force, annual rate	10. 5	9. 7

Deaths [1] from all causes in certain large cities of the United States during the week ended January 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Jan. 24, 1931				Corresponding week, 1930		Death rate [2] for first 4 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	9,890	14.5	856	[4] 66	12.7	819	14.0	12.9
Akron	40	8.1	6	59	8.6	8	8.0	8.4
Albany [5]	36	14.5	3	59	17.1	3	14.4	16.0
Atlanta	74	13.9	12	123	17.3	10	16.5	16.8
White	42		6	95		3		
Colored	32	(6)	6	172	(6)	7	(6)	(6)
Baltimore [5]	248	15.9	13	44	16.2	22	15.4	15.4
White	192		7	30		15		
Colored	56	(6)	6	94	(6)	7	(6)	(6)
Birmingham	82	15.9	2	20	8.8	2	15.2	13.1
White	45		2	34		1		
Colored	37	(6)	0	0	(6)	1	(6)	(6)
Boston	270	17.9	18	51	13.8	17	17.0	15.6
Bridgeport	37	13.1	1	17	11.0	6	13.6	13.6
Buffalo	160	14.4	20	82	14.6	18	14.1	14.4
Cambridge	30	13.7	3	60	11.9	3	14.0	14.3
Camden	39	17.1	5	87	11.0	8	17.5	13.5
Canton	26	12.7	2	46	8.4	4	11.0	10.9

See foot notes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended January 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Jan. 24, 1931				Corresponding week, 1930		Death rate [2] for first 4 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Chicago [4]	768	11.6	73	65	11.2	70	11.3	11.4
Cincinnati	136	15.5	16	96	16.5	16	17.7	16.5
Cleveland	182	10.4	20	58	12.0	21	11.1	11.9
Columbus	80	14.1	5	49	15.0	7	14.2	14.8
Dallas	71	13.6	6		13.7	6	13.3	13.5
White	51		4			6		
Colored	20	(5)	2		(5)	0	(5)	(5)
Dayton	53	13.4	7	98	9.8	5	14.1	9.6
Denver	93	16.6	7	68	14.1	5	16.9	14.5
Des Moines	36	13.0	4	70	11.7	5	13.3	14.2
Detroit	264	8.3	22	35	9.8	57	8.5	9.7
Duluth	28	14.3	1	25	9.8	1	13.4	11.0
El Paso	46	22.9	10		16.2	1	23.6	21.5
Erie	29	12.8	2	37	14.3	1	11.1	11.4
Fall River [6] [7]	22	10.0	5	113	11.8	1	12.6	12.2
Flint	27	8.6	4	51	6.9	3	8.3	8.3
Fort Worth	39	12.1	6		14.3	5	13.0	12.4
White	31		6			4		
Colored	8	(5)	0		(5)	1	(5)	(5)
Grand Rapids	40	12.1	10	148	9.9	2	9.6	10.5
Houston	76	12.8	8		14.1	9	12.8	12.6
White	43		7			8		
Colored	33	(5)	1		(5)	1	(5)	(5)
Indianapolis	98	13.8	4	33	18.0	9	14.8	16.3
White	80		4	38		6		
Colored	18	(5)	0	0	(5)	3	(5)	(5)
Jersey City	103	16.8	12	107	11.5	8	13.2	12.4
Kansas City, Kans	39	16.5	4	82	15.4	6	15.3	12.9
White	27		3	74		6		
Colored	12	(5)	1	127	(5)	0	(5)	(5)
Kansas City, Mo	107	13.6	10	76	14.8	6	14.7	13.6
Knoxville	37	17.7	3	64	13.2	1	15.0	12.7
White	27		3	71		0		
Colored	10	(5)	0	0	(5)	1	(5)	(5)
Long Beach	33	11.3	2	48	10.1	0	11.7	11.8
Los Angeles	326	12.9	30	87	12.7	20	13.7	13.2
Louisville	107	18.1	3	26	10.8	3	18.4	13.9
White	72		2	20		2		
Colored	35	(5)	1	66	(5)	1	(5)	(5)
Lowell [7]	36	18.6	4	102	17.1	4	14.9	12.6
Lynn	22	11.2	1	26	9.7	2	13.1	10.9
Memphis	101	20.4	20	212	19.3	10	19.0	16.4
White	54		9	150		1		
Colored	47	(5)	11	318	(5)	9	(5)	(5)
Miami	20	9.3	1	25	8.0	2	12.7	11.0
White	12		0	0		1		
Colored	8	(5)	1	88	(5)	1	(5)	(5)
Milwaukee	117	10.3	16	69	9.5	11	9.7	10.3
Minneapolis	109	12.0	15	97	11.1	7	12.7	12.6
Nashville	45	15.1	4	60	14.2	10	16.7	16.1
White	28		3	60		6		
Colored	17	(5)	1	59	(5)	4	(5)	(5)
New Bedford [7]	26	12.0	4	106	9.7	0	13.5	12.3
New Haven	51	16.3	3	57	13.5	1	13.2	14.1
New Orleans	186	20.7	14	77	21.7	30	21.6	20.5
White	102		8	66		16		
Colored	84	(5)	6	98	(5)	14	(5)	(5)
New York	2,243	16.5	174	73	11.6	165	14.7	11.8
Bronx Boro	315	12.3	28	63	8.6	17	10.5	8.1
Broklyn Boro	776	15.4	66	70	10.7	63	13.8	10.9
Manhattan Boro	856	24.6	58	99	16.8	70	22.4	17.6
Queens Boro	250	11.3	21	57	7.9	11	9.7	7.9
Richmond Boro	46	14.7	1	18	15.7	4	14.2	14.1
Newark, N. J	116	13.6	8	42	12.6	9	13.4	13.9
Oakland	68	12.1	7	89	13.0	4	14.0	13.6
Oklahoma City	43	11.4	7	97	13.3	5	11.7	9.8
Omaha	56	13.5	4	45	12.2	2	15.6	13.7
Paterson	33	12.4	2	34	11.3	2	13.3	12.5
Philadelphia	726	19.3	44	64	13.2	36	16.1	13.2

See foot notes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended January 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Jan. 24, 1931				Corresponding week, 1930		Death rate [2] for first 4 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Pittsburgh	219	16.9	26	90	15.2	16	16.7	14.1
Portland, Oreg.	84	14.3	0	0	14.3	2	14.3	14.3
Providence	71	14.5	11	101	14.8	5	14.6	15.7
Richmond	60	17.0	6	87	18.5	7	16.1	16.3
White	30		1	22		1		
Colored	30	(5)	5	217	(5)	6	(5)	(5)
Rochester	84	13.2	4	36	11.6	7	13.2	11.6
St. Louis	269	16.9	21	71	14.3	8	16.5	14.5
St. Paul	53	10.0	3	31	12.8	2	11.0	12.2
Salt Lake City [4]	32	11.7	1	15	15.9	6	14.7	13.7
San Antonio	78	16.9	16		24.4	20	16.1	20.9
San Diego	50	16.7	4	81	12.9	4	16.9	17.0
San Francisco	203	16.3	10	66	13.9	5	15.6	14.4
Schenectady	22	11.9	2	59	12.0	3	8.9	11.0
Seattle	81	11.4	6	57	8.5	2	13.4	10.2
Somerville	18	8.9	1	37	15.0	4	10.4	12.4
South Bend	23	11.1	3	75	7.9	1	8.0	9.7
Spokane	35	15.7	2	52	12.2	0	14.8	13.2
Springfield, Mass.	41	14.0	4	61	10.4	2	12.7	12.7
Syracuse	52	12.7	6	71	11.4	6	13.0	13.4
Tacoma	32	15.5	1	26	12.2	4	15.8	11.2
Toledo	81	14.3	6	55	13.2	5	12.4	13.5
Trenton	33	13.9	2	35	14.4	4	19.3	17.0
Utica	38	19.4	1	26	14.3	2	17.3	16.6
Washington, D. C.	178	18.8	13	72	16.5	17	18.3	16.2
White	113		6	49		9		
Colored	65	(5)	7	120	(5)	8	(5)	(5)
Waterbury	24	12.4	3	90	7.8	2	9.9	9.9
Wilmington, Del. [7]	30	14.7	6	129	13.2	4	14.7	13.9
Worcester	59	15.6	4	55	16.3	7	14.7	14.1
Yonkers	29	10.9	2	52	5.8	2	10.4	8.3
Youngstown	31	9.3	5	70	11.9	3	11.1	10.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended January 31, 1931, and February 1, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 31, 1931, and February 1, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
New England States:								
Maine	1	3	26	5	48	1	0	0
New Hampshire	1	----	10	----	141	11	0	0
Vermont	----	2	----	----	12	----	0	0
Massachusetts	93	111	307	7	588	305	2	7
Rhode Island	7	14	21	----	1	2	0	0
Connecticut	11	25	176	8	242	25	0	2
Middle Atlantic States:								
New York	133	159	[1] 646	[1] 60	418	536	31	10
New Jersey	81	125	967	13	525	274	7	6
Pennsylvania	128	207	----	----	1,441	721	9	8
East North Central States:								
Ohio	120	93	72	43	250	692	8	18
Indiana	44	31	68	----	314	107	6	11
Illinois	153	213	480	25	886	401	8	11
Michigan	53	77	16	11	185	320	5	26
Wisconsin	35	17	111	32	335	878	2	7
West North Central States:								
Minnesota	15	10	----	1	56	143	0	4
Iowa	13	8	----	8	3	342	3	2
Missouri	54	39	86	35	830	106	7	15
North Dakota	1	21	----	----	25	26	2	3
South Dakota	31	----	----	----	8	98	0	3
Nebraska	13	16	20	31	12	578	1	6
Kansas	11	16	13	16	46	254	4	1
South Atlantic States:								
Delaware	1	3	82	2	8	5	0	0
Maryland [2]	26	20	3,148	53	301	7	0	4
District of Columbia	11	26	52	1	27	4	3	1
Virginia	----	----	----	----	----	----	3	5
West Virginia	15	15	173	46	36	68	0	0
North Carolina [3]	33	40	1,764	25	150	11	0	2
South Carolina	12	16	2,873	966	24	----	0	3
Georgia [3]	10	16	323	164	52	95	1	12
Florida [3]	3	12	46	----	65	50	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 6 cases: 2 cases in Alabama; 2 cases in Georgia; 1 case in Florida; and 1 case in North Carolina.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 31, 1931, and February 1, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
East South Central States:								
Kentucky	19				170	89	7	2
Tennessee	8	5	186	134	64	114	6	11
Alabama [3]	24	19	305	208	529	47	6	1
Mississippi	21	12					6	10
West South Central States:								
Arkansas	3	10	156	228	1	7	1	2
Louisiana	49	45	117	29	2	27	7	1
Oklahoma [4]	30	35	216	164	25	91	0	6
Texas	27	52	107	214	148	114	2	1
Mountain States:								
Montana		1			4	20	1	5
Idaho		2	5		1	30	1	4
Wyoming	1		1	1		34	1	1
Colorado	11	3		1	107	101	4	4
New Mexico	6	11	6	3	38	116	0	0
Arizona	6	5	10	24	72	5	3	6
Utah [3]		1	6	3	3	129	1	2
Pacific States:								
Washington	10	6		2	67	149	3	4
Oregon	11	8	48	111	78	13	0	0
California	57	68	185	44	509	864	4	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
New England States:								
Maine	1	1	37	45	0	0	3	3
New Hampshire	0	0	1	15	1	0	0	0
Vermont	0	0	2	5	6	8	0	0
Massachusetts	1	0	375	283	0	0	4	4
Rhode Island	0	0	29	25	0	0	0	0
Connecticut	0	0	44	97	0	0	0	0
Middle Atlantic States:								
New York	1	0	743	489	3	12	7	17
New Jersey	0	0	292	231	0	0	1	2
Pennsylvania	1	0	656	540	1	1	11	12
East North Central States:								
Ohio	4	1	799	438	87	213	9	7
Indiana	1	0	402	247	105	243	3	1
Illinois	4	0	524	649	66	133	3	7
Michigan	1	0	45	401	53	76	7	3
Wisconsin	1	0	125	132	7	50	5	1
West North Central States:								
Minnesota	1	0	66	142	10	10	7	6
Iowa	2	0	150	110	55	111	0	0
Missouri	2	3	230	104	25	51	3	0
North Dakota	0	2	49	40	11	27	2	0
South Dakota	0	0	17	38	36	19	1	0
Nebraska	1	0	52	95	62	41	0	1
Kansas	1	1	56	145	100	63	1	2
South Atlantic States:								
Delaware	0	0	33	27	0	0	0	0
Maryland [3]	0	0	112	91	0	0	5	3
District of Columbia	0	0	26	16	0	0	1	0
Virginia		1						
West Virginia	0	0	34	40	11	27	7	8
North Carolina [3]	2	0	78	51	2	23	2	1
South Carolina	1	1	15	30	0	3	11	2
Georgia [3]	0	0	60	20	0	0	3	5
Florida [3]	0	1	14	12	0	1	1	1

[3] Week ended Friday.
[4] Typhus fever, 1931, 6 cases: 2 cases in Alabama; 2 cases in Georgia; 1 case in Florida; and 1 case in North Carolina.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended January 31, 1931, and February 1, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930	Week ended Jan. 31, 1931	Week ended Feb. 1, 1930
East South Central States:								
Kentucky	0	0	150	56	16	19	8	1
Tennessee	0	0	39	26	5	19	5	2
Alabama [2]	0	0	73	37	3	3	7	2
Mississippi	1	0	22	16	11	0	4	1
West South Central States:								
Arkansas	0	0	10	23	9	31	5	4
Louisiana	0	0	31	12	9	7	1	11
Oklahoma [4]	2	0	38	38	109	49	11	3
Texas	0	0	46	70	24	72	6	0
Mountain States:								
Montana	0	0	45	31	2	3	1	0
Idaho	0	1	10	8	1	7	2	1
Wyoming	0	0	26	7	0	23	0	1
Colorado	1	0	45	37	6	32	2	0
New Mexico	0	0	13	4	2	4	4	1
Arizona	1	0	10	17	0	45	2	1
Utah [3]	0	0	13	12	0	3	1	0
Pacific States:								
Washington	0	1	51	66	19	95	1	5
Oregon	0	0	27	61	38	29	1	1
California	6	7	160	341	128	71	7	8

[2] Week ended Friday.
[3] Typhus fever, 1931, 6 cases: 2 cases in Alabama, 2 cases in Georgia, 1 case in Florida, and 1 case in North Carolina.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
December, 1930										
Alabama	12	232	209	99	390	22	2	274	7	44
Montana	3	8	13	----	9	----	0	144	85	1
New Mexico	2	46	18	----	293	1	4	41	4	27
Oklahoma [1]	2	157	187	70	124	3	3	171	112	60
South Dakota	4	46	25	1	12	----	9	55	98	3
Virginia	11	303	2,520	12	446	28	2	409	3	49
Washington	5	73	41	----	99	----	1	230	107	9
Wisconsin	10	72	116	----	729	----	13	492	37	13

[1] Exclusive of Oklahoma City and Tulsa.

December, 1930

Chicken pox:	Cases
Alabama	206
Montana	237
New Mexico	101
Oklahoma [1]	59
South Dakota	75
Virginia	651
Washington	467
Wisconsin	2,274
Conjunctivitis:	
New Mexico	11
Oklahoma [1]	1
Dysentery:	
Montana	1
New Mexico	1
Oklahoma [1]	6
Dysentery and diarrhea:	
Virginia	109
German measles:	
Montana	2
New Mexico	1
Washington	107
Wisconsin	15
Hookworm disease:	
Oklahoma [1]	1

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Impetigo contagiosa:	
Washington	2
Lethargic encephalitis:	
Alabama	2
Washington	3
Wisconsin	3
Mumps:	
Alabama	57
Montana	88
New Mexico	46
Oklahoma [1]	5
South Dakota	9
Washington	154
Wisconsin	715
Ophthalmia neonatorum:	
Oklahoma [1]	1
South Dakota	1
Wisconsin	1
Puerperal septicemia:	
South Dakota	1
Washington	2
Scabies:	
Washington	14
Septic sore throat:	
Montana	1
Oklahoma [1]	40
Trachoma:	
Montana	55
New Mexico	1
South Dakota	2

	Cases
Trichinosis:	
South Dakota	1
Tularaemia:	
Alabama	1
Montana	2
New Mexico	1
Virginia	20
Wisconsin	5
Typhus fever:	
Alabama	3
Virginia	1
Undulant fever:	
Alabama	5
Virginia	2
Wisconsin	2
Vincent's angina:	
New Mexico	1
Oklahoma [1]	7
Whooping cough:	
Alabama	79
Montana	122
New Mexico	30
Oklahoma [1]	55
South Dakota	54
Virginia	321
Washington	124
Wisconsin	446

Cases of Certain Communicable Diseases Reported for the Month of November, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	199	24	138	235	93	0	65	66	219
New Hampshire	----	22	----	----	24	0	----	2	----
Vermont	283	22	27	8	26	5	14	2	150
Massachusetts	1,425	268	550	184	677	0	435	38	397
Rhode Island	76	44	5	9	65	0	23	7	55
Connecticut	304	48	296	135	147	0	117	19	185
New York	2,135	374	526	513	1,401	30	1,547	112	1,407
New Jersey	905	258	452	44	539	0	351	34	337
Pennsylvania	2,799	503	1,011	646	1,663	1	531	156	545
Ohio	2,401	320	145	311	1,707	198	539	126	220
Indiana	684	250	350	23	829	233	234	54	104
Illinois	1,694	728	373	757	1,336	96	723	71	491
Michigan	1,352	347	206	252	819	132	395	44	503
Wisconsin	1,894	80	645	477	384	29	167	23	573
Minnesota	671	83	55	----	244	42	237	26	99
Iowa	342	55	12	45	256	45	24	23	25
Missouri	405	351	1,290	59	511	63	200	124	54
North Dakota	235	47	29	84	80	77	16	22	49
South Dakota	122	33	5	17	47	56	7	13	29
Nebraska	240	57	25	26	100	84	33	4	33
Kansas	342	85	28	50	217	103	124	27	113
Delaware	13	19	4	5	49	0	8	11	8
Maryland	294	138	27	31	254	0	166	93	102
District of Columbia	38	36	14	----	102	0	71	6	?
Virginia	492	370	483	----	438	12	137	50	254
West Virginia	317	132	75	----	287	113	63	139	112
North Carolina	580	510	52	----	572	6	----	35	370
South Carolina	181	325	26	70	133	----	114	123	----
Georgia	116	141	40	46	191	0	68	79	55
Florida	23	76	36	13	32	1	40	4	16

[1] Exclusive of Oklahoma City and Tulsa.

Cases of Certain Communicable Diseases Reported for the Month of November, 1930, by State Health Officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Kentucky [1]									
Tennessee	332	318	69	62	380	13	167	135	78
Alabama	176	467	178	31	409	3	313	84	79
Mississippi	322	326	74	113	169	12	193	137	412
Arkansas	57	91	6	22	67	27	[2] 4	113	6
Louisiana	43	152	13	1	89	8	[2] 145	85	24
Oklahoma [3]	47	276	90	4	234	27	44	150	21
Texas		328			164			131	
Montana	280	11	10	61	132	24	36	6	111
Idaho	33	11	30	5	48	10	7	5	38
Wyoming	79	3	1	11	21	0	[2] 1	2	33
Colorado	282	72	249	134	136	43	88	25	81
New Mexico	54	27	55	14	16	0	54	23	2
Arizona	26	26	202	9	11	2	133	4	34
Utah [1]									
Nevada	5		2	14		2	3	0	33
Washington	305	89	66	125	180	89	111	30	139
Oregon	223	18	194	106	86	65		21	66
California	902	316	529	617	408	86	728	61	426

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1000 Population (Annual Basis) for the Month of November, 1930, Based on Provisional Populations

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	3.02	0.36	2.10	3.57	1.41	.00	0.99	1.00	3.33
New Hampshire		.57			.63	.00		.05	
Vermont	9.58	.75	.91	.27	.88	.17	.47	.07	5.08
Massachusetts	4.07	.76	1.60	.53	1.93	.00	1.24	.11	1.13
Rhode Island	1.34	.78	.09	.16	1.15	.00	.41	.12	.97
Connecticut	2.30	.36	2.24	1.02	1.11	.00	.88	.14	1.40
New York	2.05	.36	.50	.49	1.34	.03	1.49	.11	1.35
New Jersey	2.72	.78	1.36	.13	1.62	.00	1.05	.10	1.01
Pennsylvania	3.52	.63	1.27	.81	2.09	.00	.67	.20	.69
Ohio	4.38	.58	.26	.57	3.12	.36	.98	.23	.40
Indiana	2.57	.94	1.32	.09	3.12	.88	.88	.20	.39
Illinois	2.70	1.16	.59	1.21	2.13	.15	1.15	.11	.78
Michigan	3.38	.87	.51	.63	2.05	.33	.99	.11	1.26
Wisconsin	7.84	.33	2.67	1.98	1.59	.12	.69	.10	2.37
Minnesota	3.18	.39	.26		1.15	.20	1.12	.12	.47
Iowa	1.69	.27	.06	.22	1.26	.22	.12	.11	.12
Missouri	1.36	1.18	4.33	.20	1.71	.21	.67	.42	.18
North Dakota	4.18	.84	.52	1.50	1.42	1.37	.28	.39	.87
South Dakota	2.14	.58	.09	.30	.83	.98	.12	.23	.51
Nebraska	2.11	.50	.22	.23	.88	.74	.29	.04	.29
Kansas	2.21	.55	.18	.32	1.40	.67	.80	.17	.73
Delaware	.66	.97	.20	.25	2.50	.00	.41	.56	.41
Maryland	2.19	1.03	.20	.23	1.89	.00	1.24	.69	.76
District of Columbia	.95	.90	35		2.54	.00	1.77	.15	.17
Virginia	2.47	1.86	2.43		2.20	.06	.69	.25	1.28
West Virginia	2.22	.93	.53		2.01	.79	.44	.97	.79
North Carolina	2.22	1.95	.20		2.19	.02		.13	1.41
South Carolina	1.27	2.28	.18	.49	.93	.00	.80	.86	
Georgia	.49	.59	.17	.19	.80	.00	.29	.33	.23
Florida	.19	.63	.30	.11	.26	.01	.33	.03	.13

Case Rates per 1000 Population (Annual Basis) for the Month of November, 1930, Based on Provisional Populations—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Kentucky [1]									
Tennessee	1.54	1.48	.32	.29	1.77	.06	.78	.63	.36
Alabama	.81	2.14	.82	.14	1.88	.01	1.44	.39	.36
Mississippi	1.95	1.97	.45	.68	1.02	.07	1.17	.83	2.49
Arkansas	.37	.60	.04	.14	.44	.18	[3] .03	.74	.04
Louisiana	.25	.88	.08	.01	.52	.05	[2] .84	.49	.14
Oklahoma [3]	.28	1.62	.53	.02	1.38	.16	.26	.88	.12
Texas		.68			.34			.27	
Montana	6.35	.25	.23	1.38	2.99	.54	.82	.14	2.52
Idaho	.90	.30	.82	.14	1.31	.27	.19	.14	1.04
Wyoming	4.27	.16	.05	.59	1.13	.00	[2] .05	.11	1.78
Colorado	3.31	.84	2.92	1.57	1.60	.50	1.03	.29	.95
New Mexico	1.53	.77	1.56	.40	.45	.00	1.53	.65	.06
Arizona	.72	.72	5.61	.25	.31	.06	3.69	.11	.94
Utah [1]									
Nevada	.67		.27	1.87		.27	.40	.00	4.40
Washington	2.37	.69	.51	.97	1.40	.69	.86	.23	1.08
Oregon	2.84	.23	2.47	1.35	1.09	.83		.27	.84
California	1.92	.67	1.12	1.31	.87	.18	1.55	.13	.91

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of December, 1930, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Kansas	Massachusetts	Minnesota	New Jersey	New York	Oregon
Diphtheria		1					2	
Measles							1	
Paratyphoid fever							1	
Poliomyelitis					1			
Syphilis			19		2			
Tuberculosis	2				33			7
Typhoid fever				2		1	1	
Undulant fever		1					1	

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,350,000. The estimated population of the 89 cities reporting deaths is more than 31,805,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended January 24, 1931, and January 25, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,335	1,595	
96 cities	508	696	988
Measles:			
45 States	7,992	6,762	
96 cities	2,582	1,387	
Meningococcus meningitis:			
46 States	132	239	
96 cities	60	92	
Poliomyelitis: 47 States	49	20	
Scarlet fever:			
46 States	5,458	5,031	
96 cities	2,132	1,817	1,474
Smallpox:			
46 States	995	1,755	
96 cities	103	162	55
Typhoid fever:			
46 States	148	173	
96 cities	40	26	32
Deaths reported			
Influenza and pneumonia: 89 cities	1,712	963	
Smallpox: 89 cities	0	0	

City reports for week ended January 24, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	13	1	0	1	0	0	11	3
New Hampshire:								
Concord	0	0	0	----	0	0	0	1
Nashua	0	0	0	----	0	0	0	0
Vermont:								
Barre	3	0	0	----	0	0	2	0
Burlington	1	0	3	----	0	0	0	0
Massachusetts:								
Boston	80	35	31	66	3	86	12	41
Fall River	4	4	4	----	0	0	10	2
Springfield	15	5	1	----	0	2	6	2
Worcester	14	5	4	26	1	1	1	7
Rhode Island:								
Pawtucket	15	1	2	----	0	0	0	0
Providence	5	10	1	1	0	0	0	7
Connecticut:								
Bridgeport	1	6	0	1	1	2	2	2
Hartford	2	6	1	10	0	103	0	4
New Haven	18	1	0	18	0	23	29	5

City reports for week ended January 24, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	44	13	14	----	0	49	48	22
New York	171	208	78	1,140	147	161	17	508
Rochester	12	8	2	----	1	2	3	7
Syracuse	28	3	1	----	0	8	0	5
New Jersey:								
Camden	3	7	1	5	3	77	2	5
Newark	48	21	18	191	6	6	6	18
Trenton	10	3	0	88	1	0	3	2
Pennsylvania:								
Philadelphia	140	71	24	104	44	74	19	128
Pittsburgh	93	23	9	2	2	26	12	46
Reading	18	2	2	----	0	159	41	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	19	10	0	1	2	38	25	17
Cleveland	184	31	15	26	3	1	100	19
Columbus	18	4	1	1	1	3	4	6
Toledo	67	8	9	1	1	2	18	4
Indiana:								
Fort Wayne	7	5	5	----	0	16	0	4
Indianapolis	54	10	0	----	2	10	12	15
South Bend	5	1	0	----	0	0	0	6
Terre Haute	7	1	0	----	0	0	0	1
Illinois:								
Chicago	113	110	99	226	19	26	39	95
Springfield	----	1	----	----	----	----	----	----
Michigan:								
Detroit	115	56	31	12	1	7	15	19
Flint	12	3	0	----	0	1	5	3
Grand Rapids	7	2	0	----	1	0	0	2
Wisconsin:								
Kenosha	40	1	0	----	0	0	9	1
Madison	30	0	1	----	0	1	24	----
Milwaukee	140	17	1	----	0	18	194	14
Racine	25	2	0	----	0	0	0	1
Superior	6	0	1	----	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	----	0	0	0	2
Minneapolis	54	23	3	----	2	13	30	15
St. Paul	31	7	0	----	3	1	3	3
Iowa:								
Davenport	1	1	0	----	----	0	0	----
Des Moines	5	2	1	----	----	0	0	----
Sioux City	8	0	1	----	----	1	5	----
Waterloo	8	1	0	----	----	1	0	----
Missouri:								
Kansas City	37	6	8	1	1	34	2	21
St. Joseph	1	3	1	----	3	0	2	4
St. Louis	26	43	26	1	----	983	5	----
North Dakota:								
Fargo	15	0	0	----	0	----	7	0
Grand Forks	1	1	1	----	----	0	4	----
South Dakota:								
Sioux Falls	0	1	0	----	----	0	0	----
Nebraska:								
Omaha	5	5	4	----	0	0	4	9
Kansas:								
Topeka	14	2	0	2	1	3	0	3
Wichita	10	2	1	----	0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	4	2	2	----	0	3	0	6
Maryland:								
Baltimore	188	26	8	1,046	10	198	16	38
Cumberland	1	1	0	2	0	0	0	1
Frederick	6	0	0	----	0	1	0	0
District of Columbia:								
Washington	35	19	10	28	2	25	0	26
Virginia:								
Lynchburg	5	1	1	----	0	0	0	3
Norfolk	12	3	2	882	0	0	0	11
Richmond	10	5	4	42	2	91	1	9
Roanoke	7	3	0	----	0	0	0	5

City reports for week ended January 24, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
West Virginia:								
Charleston	3	2	0	4	2	0	4	3
Wheeling	25	2	0	----	0	2	0	2
North Carolina:								
Raleigh	11	1	0	----	0	1	0	2
Wilmington	47	1	1	----	0	1	0	3
Winston-Salem	9	1	0	45	2	1	0	12
South Carolina:								
Charleston	1	2	1	198	0	12	1	7
Columbia	----	0	----	----	----	----	----	----
Greenville	1	0	0	0	0	0	0	0
Gerogia:								
Atlanta	7	5	3	53	0	59	0	16
Brunswick	0	0	0	----	0	0	0	1
Savannah	0	1	2	21	1	0	0	4
Florida:								
Miami	10	2	3	----	0	0	1	0
Tampa	0	2	0	----	0	5	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1	----	0	1	0	2
Tennessee:								
Memphis	36	5	4	----	3	8	1	16
Nashville	2	2	0	----	2	10	0	8
Alabama:								
Birmingham	10	3	7	5	4	101	0	16
Mobile	0	2	1	----	1	0	0	5
Montgomery	9	1	0	1	----	0	1	----
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	0	0	----	----	0	0	----
Little Rock	13	2	1	----	0	0	0	4
Louisiana:								
New Orleans	3	15	9	12	12	0	0	26
Shreveport	0	2	0	----	0	0	0	3
Oklahoma:								
Muskogee	0	0	1	3	0	0	0	0
Oklahoma City	0	2	0	----	0	0	0	8
Texas:								
Dallas	19	8	2	1	2	3	3	13
Fort Worth	13	4	7	----	0	0	0	6
Galveston	1	1	2	----	0	0	0	3
Houston	7	8	6	----	2	0	0	10
San Antonio	3	2	4	----	8	0	0	12
MOUNTAIN								
Montana:								
Billings	0	0	0	----	0	0	0	0
Great Falls	4	0	0	----	0	0	0	0
Helena	3	0	0	----	0	0	0	0
Missoula	0	1	0	1	1	0	0	2
Idaho:								
Boise	1	0	0	----	0	0	0	0
Colorado:								
Denver	43	9	2	----	3	9	26	10
Pueblo	7	1	0	----	1	78	1	3
New Mexico:								
Albuquerque	0	1	0	----	0	0	1	1
Arizona:								
Phoenix	0	0	3	----	0	1	0	6
Utah:								
Salt Lake City	13	4	2	----	0	0	5	2
Nevada:								
Reno	0	0	0	----	0	0	0	1
PACIFIC								
Washington:								
Seattle	22	4	3	----	----	0	27	----
Spokane	35	2	2	----	----	18	1	----
Tacoma	13	4	11	----	0	0	1	3
Oregon:								
Portland	16	10	2	2	1	13	3	9
Salem	0	1	0	----	0	16	11	0
California:								
Los Angeles	61	43	15	49	6	15	13	26
Sacramento	25	2	7	----	0	1	3	8
San Francisco	42	15	7	12	3	3	6	6

City reports for week ended January 24, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
NEW ENGLAND											
Maine:											
Portland	4	14	0	0	0	0	0	0	0	22	44
New Hampshire:											
Concord	1	0	0	0	0	2	0	0	0	0	15
Nashua	0	0	0	0	0	0	0	0	0	0	----
Vermont:											
Barre	0	0	0	0	0	4	0	0	0	7	6
Burlington	1	0	0	0	0	0	0	0	0	0	10
Massachusetts:											
Boston	82	117	0	0	0	15	1	1	0	43	270
Fall River	5	18	0	0	0	0	0	0	0	3	22
Springfield	9	8	0	0	0	0	0	0	0	8	32
Worcester	11	22	0	0	0	1	0	0	0	9	59
Rhode Island:											
Pawtucket	1	14	0	0	0	0	0	0	0	0	13
Providence	13	34	0	0	0	0	0	0	0	3	71
Connecticut:											
Bridgeport	10	4	0	0	0	3	1	0	0	6	37
Hartford	7	7	0	0	0	1	0	0	0	4	41
New Haven	8	1	0	0	0	4	0	0	0	1	51
MIDDLE ATLANTIC											
New York:											
Buffalo	27	38	0	0	0	3	1	0	0	26	153
New York	241	288	0	0	0	103	7	2	0	130	2,243
Rochester	9	93	0	0	0	4	0	0	0	42	82
Syracuse	14	14	0	0	0	1	1	0	0	5	52
New Jersey:											
Camden	7	11	0	0	0	2	0	0	0	0	39
Newark	39	25	0	0	0	2	1	2	0	21	105
Trenton	5	13	0	0	0	5	0	0	0	0	33
Pennsylvania:											
Philadelphia	101	168	0	0	0	35	2	2	0	24	726
Pittsburgh	36	48	0	0	0	7	1	1	0	21	219
Reading	4	4	0	0	0	1	0	0	0	0	20
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	23	34	1	0	0	2	0	0	0	0	136
Cleveland	45	79	1	0	0	13	1	2	0	34	182
Columbus	11	4	1	1	0	3	0	0	0	0	80
Toledo	14	15	1	5	0	7	0	0	0	3	81
Indiana:											
Fort Wayne	6	6	1	0	0	0	0	0	0	2	22
Indianapolis	10	52	4	23	0	7	0	0	0	18	----
South Bend	3	2	0	0	0	1	0	0	0	4	23
Terre Haute	4	3	0	0	0	0	0	0	0	0	21
Illinois:											
Chicago	136	266	1	6	0	53	3	2	1	55	768
Springfield	3	----	0	----	----	----	0	----	----	----	----
Michigan:											
Detroit	110	121	2	2	0	27	1	0	0	81	264
Flint	13	16	1	0	0	2	0	1	0	13	27
Grand Rapids	12	14	0	3	0	0	0	0	0	1	40
Wisconsin:											
Kenosha	2	3	0	0	0	0	0	0	0	0	9
Madison	4	6	0	0	----	----	0	0	----	6	----
Milwaukee	37	20	0	0	0	5	0	0	0	28	117
Racine	6	5	0	0	0	0	0	0	0	1	15
Superior	3	0	0	0	0	0	0	0	0	0	6
WEST NORTH CENTRAL											
Minnesota:											
Duluth	11	6	3	0	0	1	0	0	0	1	28
Minneapolis	51	19	0	0	0	0	0	1	0	15	109
St. Paul	32	2	0	0	0	3	0	1	0	6	55
Iowa:											
Davenport	2	2	1	6	----	----	0	0	----	0	----
Des Moines	11	10	2	4	----	----	0	0	----	0	36
Sioux City	1	16	0	1	----	----	0	0	----	0	----
Waterloo	2	0	1	1	----	----	0	0	----	0	----

City reports for week ended January 24, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	19	8	1	1	0	3	0	0	0	5	107
St. Joseph	2	6	0	0	0	0	0	0	0	0	34
St. Louis	37	91	1	3	0	11	0	2	0	4	209
North Dakota:											
Fargo	3	1	1	0	0	0	0	1	0	2	9
Grand Forks	0	1	0	0			0	0		0	
South Dakota:											
Sioux Falls	2	1	0	7			0	0		0	8
Nebraska:											
Omaha	5	15	1	16	0	1	0	0	0	7	56
Kansas:											
Topeka	2	3	0	0	0	1	0	0	0	0	15
Wichita	4	2	1	18	0	3	0	0	1	6	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	18	0	0	0	1	0	0	0	1	30
Maryland:											
Baltimore	36	37	0	0	0	18	1	1	0	24	248
Cumberland	1	5	0	0	0	0	0	1	0	0	13
Frederick	0	4	0	0	0	0	0	0	0	0	5
District of Col.:											
Washington	25	32	0	0	0	15	0	1	0	5	178
Virginia:											
Lynchburg	1	0	0	0	0	1	0	0	0	0	11
Norfolk	3	1	0	0	0	1	0	0	0	9	
Richmond	5	14	0	0	0	5	0	0	0	1	52
Roanoke	1	2	1	0	0	1	0	0	0	0	19
West Virginia:											
Charleston	2	0	0	1	0	0	0	2	0	1	18
Wheeling	2	3	0	0	0	0	0	0	0	0	15
North Carolina:											
Raleigh	1	0	1	0	0	0	0	0	0	8	14
Wilmington	0	0	0	1	0	1	0	0	0	9	12
Winston-Salem	3	3	1	0	0	1	0	0	0	0	35
South Carolina:											
Charleston	1	3	0	0	0	1	0	0	0	0	25
Columbia	0		0				0				
Greenville	0	2	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	5	33	2	0	0	0	0	1	1	1	74
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	10	0	0	0	0	1	0	0	0	30
Florida:											
Miami	2	0	0	0	0	2	0	0	0	5	20
Tampa	1	6	0	0	0	5	1	1	0	0	31
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	25	1	0	0	3	0	0	0	0	27
Tennessee:											
Memphis	7	39	2	5	0	2	1	2	0	0	101
Nashville	2	9	0	0	0	4	1	0	0	2	45
Alabama:											
Birmingham	4	9	1	0	0	4	0	0	0	3	82
Mobile	2	1	0	0	0	3	0	0	0	0	25
Montgomery	2	0	0	0			1	0		2	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	3	0	0			0	0		0	
Little Rock	2	4	0	0	0	1	0	0	0	0	
Louisiania:											
New Orleans	8	22	0	3	0	8	3	1	1	2	186
Shreveport	1	0	0	0	0	1	0	0	0	0	29

City reports for week ended January 24, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases, reported	Cases, estimated expectancy	Cases, reported	Deaths, reported		Cases, estimated expectancy	Cases, reported	Deaths, reported		
WEST SOUTH CENTRAL—contd.											
Oklahoma:											
Muskogee	1	0	2	0	0	0	0	0	0	0	--
Oklahoma City	3	5	1	5	0	4	0	0	0	0	43
Texas:											
Dallas	6	4	2	0	0	3	0	1	1	3	71
Fort Worth	2	4	1	0	0	1	1	0	0	3	39
Galveston	1	1	0	0	0	1	0	5	0	0	15
Houston	4	8	2	7	0	3	0	1	0	0	76
San Antonio	3	0	1	0	0	9	0	0	0	0	78
MOUNTAIN											
Montana:											
Billings	2	0	0	0	0	1	0	0	0	3	6
Great Falls	3	7	2	0	0	0	0	0	0	11	4
Helena	0	0	0	1	0	0	0	0	0	0	9
Missoula	1	0	0	0	0	1	0	0	0	0	10
Idaho:											
Boise	2	0	0	0	0	0	0	0	0	1	7
Colorado:											
Denver	12	31	0	0	0	8	0	0	0	17	92
Pueblo	2	0	0	0	0	0	1	1	0	7	13
New Mexico:											
Albuquerque	1	2	0	0	0	3	0	0	0	0	11
Arizona:											
Phoenix	0	1	0	0	0	4	0	0	0	0	--
Utah:											
Salt Lake City	5	3	1	0	0	2	0	1	0	13	32
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	10	15	2	0	--	--	1	1	--	26	--
Spokane	10	8	5	5	--	--	0	0	--	2	--
Tacoma	3	3	4	1	0	2	0	0	0	4	32
Oregon:											
Portland	5	2	9	10	0	4	0	0	0	0	84
Salem	0	0	1	0	0	0	0	0	0	0	--
California:											
Los Angeles	41	24	4	1	0	29	1	2	0	9	326
Sacramento	2	0	1	1	0	1	0	0	0	7	36
San Francisco	22	11	2	2	0	15	1	0	0	27	222

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	3	1	1	0	0	0	1	0	1
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	1	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	15	11	5	2	0	0	1	0	0
New Jersey:									
Newark	3	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	2	2	1	0	0	0	0	0	0
Pittsburgh	4	1	1	2	0	0	0	1	0

City reports for week ended January 24, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	4	0	0	0	0	0	0	0	0
Cleveland	1	2	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	0	0
Terre Haute	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	4	2	0	0	1	1	0	0	0
Michigan:									
Detroit	1	1	0	0	0	0	1	1	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	1	0	0	0	0	0	0	0	0
Racine	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
St. Paul	0	0	0	0	0	0	0	1	0
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	1	0
St. Louis	1	0	0	0	0	0	0	0	0
North Dakota:									
Grand Forks	0	0	0	0	0	0	0	1	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
District of Columbia:									
Washington	1	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia:[1]									
Atlanta	0	0	0	0	3	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	5	3	0	0	0	0	0	0	0
Alabama:									
Birmingham	4	2	1	1	0	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	2	0	0	2	2	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Oklahoma:									
Muskogee	0	0	0	0	1	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
MOUNTAIN									
Idaho:									
Boise	1	0	0	0	0	0	0	0	0
Colorado:									
Denver	0	1	0	0	0	0	0	0	0
Arizona:									
Phoenix	1	5	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	1	3	0	0	0	0	0	0	0
Sacramento	0	1	0	0	0	0	0	0	0
San Francisco	0	0	1	0	0	0	0	4	2

[1] Typhus fever: 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended January 24, 1931, compared with those for a like period ended January 25, 1930. The population figures used in computing the rates previous to 1931 are approximate estimates. Those used in computing the rates for the weeks ended January 3 and January 4, and subsequent weeks, are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities December 21, 1930, to January 24, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	73	120	78	113	81	114	74	108	[2] 79	110
New England	69	126	115	141	76	162	91	133	106	160
Middle Atlantic	49	113	67	81	62	107	56	89	67	91
East North Central	103	167	89	153	97	130	95	126	[3] 94	144
West North Central	53	67	82	116	98	126	82	110	84	83
South Atlantic	79	79	61	94	83	90	69	112	[4] 65	116
East South Central	94	109	70	102	116	72	70	60	76	66
West South Central	153	171	132	181	142	153	108	192	81	146
Mountain	60	35	61	53	35	70	52	53	35	35
Pacific	47	82	53	99	61	73	47	81	88	79

MEASLES CASE RATES

98 cities	185	91	276	126	350	171	324	203	[2] 404	220
New England	279	90	267	129	469	116	310	172	522	230
Middle Atlantic	74	51	99	72	177	109	158	117	251	111
East North Central	28	97	54	117	63	152	87	150	[3] 74	135
West North Central	1,250	145	1,871	283	2,156	310	1,829	372	1,984	467
South Atlantic	114	30	318	144	429	128	500	182	[4] 804	172
East South Central	364	0	896	6	861	12	995	36	698	24
West South Central	26	88	24	91	20	293	7	373	10	582
Mountain	223	78	313	203	226	150	374	247	757	220
Pacific	19	326	24	261	33	443	55	579	72	626

SCARLET FEVER CASE RATES

98 cities	227	216	227	242	277	264	316	272	[2] 333	288
New England	323	299	325	391	414	411	539	397	575	457
Middle Atlantic	200	165	226	175	240	218	282	212	314	226
East North Central	288	311	255	341	363	350	398	394	[3] 383	375
West North Central	241	179	235	234	296	221	321	265	323	314
South Atlantic	163	144	259	202	276	218	304	216	[4] 343	192
East South Central	385	75	291	114	396	96	465	90	483	149
West South Central	64	122	105	80	68	129	129	125	142	98
Mountain	369	322	218	388	322	493	331	344	357	379
Pacific	99	246	71	225	72	241	72	237	119	344

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1931, 1930, and 1929, respectively.
[2] Springfield, Ill., and Columbia, S. C., not included.
[3] Springfield, Ill., not included.
[4] Columbia, S. C., not included.

Summary of weekly reports from cities December 21, 1930, to January 24, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929–30—Continued

SMALLPOX CASE RATES

	Week ended—									
	Dec. 27, 1930	Dec. 28, 1929	Jan. 3, 1931	Jan. 4, 1930	Jan. 10, 1931	Jan. 11, 1930	Jan. 17, 1931	Jan. 18, 1930	Jan. 24, 1931	Jan. 25, 1930
98 cities	7	18	7	19	13	30	16	32	[3] 16	26
New England	0	0	0	0	0	0	0	0	0	5
Middle Atlantic	0	0	0	0	0	0	0	0	0	1
East North Central	3	20	5	16	15	27	10	36	[3] 21	19
West North Central	42	58	46	81	63	91	98	124	77	72
South Atlantic	0	2	0	2	2	0	0	6	[4] 4	2
East South Central	0	7	0	0	6	6	17	0	29	0
West South Central	19	27	17	14	37	66	27	38	34	35
Mountain	34	44	9	53	9	44	78	53	9	26
Pacific	24	77	10	89	18	146	29	123	20	152

TYPHOID FEVER CASE RATES

98 cities	7	4	5	3	4	3	5	5	[2] 6	4
New England	2	2	2	2	5	0	0	5	2	0
Middle Atlantic	3	3	4	1	2	3	2	3	3	5
East North Central	13	1	4	2	2	2	2	2	[3] 3	2
West North Central	6	2	2	0	0	2	4	12	10	2
South Atlantic	15	9	4	6	10	10	10	6	[4] 14	8
East South Central	20	34	47	6	12	6	52	12	12	18
West South Central	0	8	3	0	20	3	14	7	27	3
Mountain	9	0	17	9	17	0	9	62	17	9
Pacific	7	10	6	8	2	4	2	4	6	2

INFLUENZA DEATH RATES

91 cities	12	19	16	16	24	18	36	19	[3] 52	21
New England	2	9	7	7	5	0	10	10	12	10
Middle Atlantic	11	13	17	9	28	13	59	14	91	14
East North Central	8	13	7	15	12	12	9	17	[3] 18	17
West North Central	9	15	3	27	21	30	18	37	29	18
South Atlantic	22	26	20	20	28	34	41	24	[4] 38	34
East South Central	22	30	25	26	44	58	63	39	63	52
West South Central	34	94	90	71	76	57	79	60	83	103
Mountain	0	26	17	18	44	44	35	26	44	9
Pacific	21	19	10	10	22	12	10	12	22	15

PNEUMONIA DEATH RATES

91 cities	129	143	160	165	185	160	219	151	[3] 229	140
New England	109	94	159	169	108	176	159	126	178	138
Middle Atlantic	132	155	182	170	231	181	311	159	332	128
East North Central	95	116	101	114	110	121	124	108	[3] 125	110
West North Central	115	174	177	197	200	153	212	209	171	150
South Atlantic	159	152	227	240	243	192	237	186	[4] 280	214
East South Central	184	194	202	227	265	123	227	142	296	194
West South Central	203	234	186	295	238	189	228	221	245	288
Mountain	189	209	261	185	244	229	270	256	157	220
Pacific	166	104	130	92	134	120	118	137	103	77

[3] Springfield, Ill., and Columbia, S. C., not included.
[2] Springfield, Ill., not included.
[4] Columbia, S. C., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended January 24, 1931.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended January 24, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia [1]						
New Brunswick [1]						
Quebec	1					4
Ontario		25	1	1	3	17
Manitoba						7
Saskatchewan					6	
Alberta					7	
British Columbia		38				1
Total	1	63	1	1	16	29

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended January 24, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended January 24, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Ophthalmia neonatorum	3
Chicken pox	114	Scarlet fever	107
Diphtheria	47	Smallpox	2
Erysipelas	11	Tuberculosis	80
German measles	8	Typhoid fever	4
Measles	52	Whooping cough	52
Mumps	172		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Oct. 19–Nov. 15, 1930	Week ended— November, 1930		December, 1930				January, 1931				
						22	29	6	13	20	27	3	10	17	24	31
Afghanistan	C	P														
China:																
Amoy	C		2													
	D		2													
Canton	C			1	1											
Shanghai	C		34	38	2											
	D		3	4												
Shensi Province	C		P													
Swatow	C	3	2													
Tientsin	C	2	1													
India	C	42,893	51,551	36,529	18,944	3,166										
	D	22,358	23,959	17,635	9,782	1,616										
Bassein	C		1											20		
Bombay	C	14	1	16	19	2	2	4	5					6		
	D	8	2	11	17	2	1	1	3							
Calcutta	C	63	27	24	33	4	6	2	10	9	7	6	6			
	D	30	12	15	16	4	4	1	7	6	4	5	5			
Madras	C	1		2	1					14	44	70				
	D	1		2						8	12	19	28			
Rangoon	C	1	2	1							1					
	D	1	1	1							1					
Tuticorin	C			1	1	4		1		1						
	D			1	1											
India (French):																
Chandernagor	C		1	3	1		1									
	D			1						1						
Pondicherry	C			1	1	1	1	1	1	3	9					
	D			1		1	1	1	1	3	3					
India (Portuguese)	C	1	1		14											
	D		1		9											

Indo-China (see also table below):																	
Pnompenh	C	11	----	2	1	----	1	1	----	----	----	----	----	----	1	----	
	D	6	----	----	----	----	1	1	----	----	----	----	----	----	----	----	
Saigon and Cholon	C	5	----	2	1	----	1	----	2	1	----	4	4	4	----	----	
	D	1	----	----	----	----	1	----	----	----	----	2	2	2	----	----	
Philippine Islands:[1]																	
Ports—																	
Cebu	C	9	2	----	----	----	----	----	----	----	----	----	----	----	----	----	
	D	8	2	----	----	----	----	----	----	----	----	----	----	----	----	----	
Iloilo	C	64	10	1	----	----	1	----	----	----	----	1	----	----	----	2	
	D	56	14	4	----	----	3	----	----	----	----	1	----	----	----	2	
Manila	C	1	43	5	----	----	----	----	----	----	----	----	----	----	----	----	
	D	----	12	1	----	----	----	----	----	----	----	----	----	----	----	----	
Provinces—																	
Antique	C	20	47	40	----	----	----	----	----	----	----	----	----	----	----	----	
	D	12	34	18	----	----	----	----	----	----	----	----	----	----	----	----	
Bohol	C	138	49	----	----	----	----	----	----	----	----	----	----	----	----	----	
	D	79	20	----	----	----	----	----	----	----	----	----	----	----	----	----	
Bulacan	C	1	4	2	----	----	----	----	----	----	----	----	----	----	----	----	
	D	----	2	1	----	----	----	----	----	----	----	----	----	----	----	3	
Capiz	C	2	1	----	----	----	----	----	----	----	----	----	----	----	----	2	
	D	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Cebu	C	85	25	----	----	----	----	----	----	----	----	----	----	----	----	----	
	D	50	11	----	----	----	----	----	----	----	----	----	----	----	----	----	
Iloilo	C	571	238	50	30	11	21	13	----	7	5	13	3	11	41	36	
	D	376	151	40	23	8	11	8	----	6	4	10	2	9	27	25	
Masbate	C	34	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
	D	14	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Negros, Occidental	C	343	122	28	56	44	38	48	33	28	19	33	40	19	32	33	
	D	237	91	20	41	33	17	45	28	22	16	26	33	15	17	19	
Negros, Oriental	C	8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
	D	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Pampanga	C	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	
Pangasinan	C	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
	D	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Samar	C	18	4	7	16	4	4	----	----	2	----	12	2	----	----	----	
	D	16	2	7	12	4	4	----	----	1	1	7	1	----	----	----	
Sorsogon	C	----	----	----	5	----	----	----	----	----	----	----	----	----	----	----	
	D	----	----	----	4	----	----	----	----	----	----	----	----	----	----	----	
Surigao	C	28	1	(2)	----	----	----	----	----	----	----	----	----	----	----	----	
	D	17	2	----	----	----	----	----	----	----	----	----	----	----	----	----	
Tarlac	C	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	
Siam	C	3	----	4	4	2	1	1	2	----	----	2	1	----	----	----	
	D	2	----	1	4	2	1	1	2	----	----	2	1	----	----	----	
Bangkok	C	1	----	3	3	2	1	----	1	2	1	1	2	----	----	----	
	D	1	----	2	2	2	1	----	1	2	1	1	1	----	----	----	
On vessel: S. S. Malwa from Shanghai	D	----	1	----	----	----	----	----	----	----	----	----	----	----	----	----	

[1] Figures for cholera in the Phillippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June, 1930	July, 1930	August, 1930	September, 1930			October, 1930			November, 1930			Dec. 1–10, 1930
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	
Indo-China (French) (see also table above):														
Annam [1]	C	16	1	3										
Cambodia [1]	C	144	43	59	23	13	2	16		6		1		28
Cochin-China [1]	C	273	46	27	9	6	18	14	6	8		5		8

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		July, 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended—														
					Oct. 25, 1930	November, 1930					December, 1930				January, 1931				
						1	8	15	22	29	6	13	20	27	3	10	17	24	31
Algeria:																			
Algiers	C	7	11	6	5	3	1	2			1	1	1				1		
	D				3														
Constantine	C						1							3	1	1			
Oran	C	4	10	10	1			1											
	D		1	3				1											
Plague-infected rats			10	6	1														
Philippeville	C		1	3	1		1									1			
Argentina:																			
Cordoba Province—Chazon	C											1						1	
Jujuy Province—Palpala	C																		1
Belgian Congo	C	2	5					1				1							
	D	2	3					1				1							

British East Africa (see also table below):																			
Tanganyika	C										3		2						
	D										3		2						
Uganda	C	236	202	165	53	37	34	47	37	17	33								
	D	229	191	164	53	36	33	46	37	18	33								
Canary Islands: Las Palmas	D	1																	
Ceylon: Colombo	C	2	2	3				1	1		4	4	4		4	1	1		
	D	2	3	3				1	1		3	4	4		4	1			
Plague-infected rats								1	1	1									
China:																			
Manchuria—Tungliau and Nungan	C	30	29	2															
Shensi	C		P		P														
Dutch East Indies:																			
Batavia and West Java	C	83	79	107	41	36	27	39	53	56	41	58							
	D	83	76	103	42	37	28	39	53	56	39	58							
Plague-infected rats		1	3																
Java and Madura	D	188	260	335	124	140	107	130	137	127	132	161	159						
Egypt:																			
Alexandria	C	11	10	9	2	1	1	3		1	1	2	1	1		1			
	D	6	8	6	3		2	2				1							
Assiout	C						3			2		7	5	1		1	2		
	D						1					1				1	2		
Aswan	C									3							1		
Beni-Suef	C	1																19	2
Deirout	C																	2	2
	D																		1
Gharbieh	C	3																	1
	D	1											3	1	3				
Girga	D		1											1	1				
	D															23	5	21	4
Mansalut	C															5	2	3	1
	D																	1	1
Minieh	C											1							
Port Said	C	1			1	1													
France: Marseille	C		5	4	2	1		1											
Gambia	C	4																	
	D	4																	
Greece (see also table below): Pyrgos	C			2															
India	C	877	2,497	2,371	604	616	558	943	677										
	D	477	1,132	1,068	336	288	317	556	443										
Bassein	C		2			1										2	1		
	D		3													1			
Bombay	C		1	2	1													1	
	D		1	2		1												1	
Plague-infected rats		35	47	64	2	9	11	8	11	5	12	4	10	4	6	13	10		
Madras Presidency	C	81	127	196	69	31	45	40	33	62	28			4					
	D	34	57	110	43	22	37	22	24	26	15								
Rangoon	C	3	10	2		1		1						1	1				
	D	2	9	2		1								1					
Plague-infected rats		7	8	1	1				1	1			1				2		
India (Portuguese)	D	P				3													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		July, 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930					December, 1930				January, 1931				
						1	8	15	22	29	6	13	20	27	3	10	17	24	31
Indo-China (see also table below):																			
Pnompenh	C	4	3	2					1	3	1	1	1				1		
	D			3	1				1	3	1	1	1				1		
Saigon and Cholon	C	1	1	1															3
Iraq: Baghdad	C	9		1				P	2	2									
	D	3		1					1	1									2
Kwang-Chow-Wan	C	1																	
Madagascar (see also table below): Tamatave	C	2	1	1	3		2			2	1	1		2					
	D			1	3					2		1							
Morocco	C	15			4		1						9		10				
	D	2											4		4				
Nigeria: Lagos	C	7	6	5	33	1	2	2	4	3	2		2		1				
	D	7	6	5		1	2	2	4	3	2		2		1				
Plague-infected rats		8	10	11	3	1	2	7	1	1	1	2	4						
Peru: Lima,[1]																			
Siam	C	7	3	1	3	1	1	1											
	D	6	2		3	1		1											
Bangkok	C	3						1				1		1	2				
	D	2						1				1		1	2				
Nagara Rajsima	C	2	1	1				1		3		8	4	3	4	6	3		
	D	2	1	1				1		3		6	3	3	1	3	2		
Syria: Beirut	C	2	5		1	1	3	1								1			
Tripolitania	C	2							4	6	2	1					2	2	
Tunisia:																			
Sfax district	C	1																	
Tunis	C					1		1				P	12			1	1		
Union of Socialist Soviet Republics:																			
Salsk region	C	7																	
	D	5																	
Transcaucasia-Karabakh	C																	6	

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Union of South Africa:							
Cape Province	C	1	1		1		
	D	1	1				
Orange Free State	C		2				
	D		2				
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C						
British East Africa (see also table above):							
Kenya	C	107	97	87	53	58	62
Greece (see also table above)	C	1				2	
Indo-China (see also table above)	C	11	1	2	4		
Madagascar (see also table above):							
Antisirabe Province	C	3	24	11	21	3	
	D	3	24	11	21	3	
Miarinarivo Province	C	1	1	2	7	18	
	D	1	1	2	7	18	
Moramanga Province	C	3		27	18	20	
	D	3		27	17	20	
Tananarive Province	C	16	28	39	79	125	
	D	16	28	38	79	116	

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Senegal:							
Baol [2]	C	2	62	79	48	53	
	D	2	48	20	23	35	4
Dakar [2]	C	53	140	108	3		
	D	117	122	90	8		
Louga [2]	C	60	138	75	61	37	10
	D	21	103	33	30	25	3
Thies [2]	C	52	54	34	12	24	27
	D	35	30	20	4	15	23
Tivaouane [2]	C	43	119	110	20	53	31
	D	28	70	54	14	31	25

[1] Eight cases of plague were reported at Lima, Peru, during December, 1930. Plague infection is said to exist in interior towns north of Lima.
Senegal (see table below).
[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases: D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended Oct. 25, 1930	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24	Jan. 31
Algeria:																			
Algiers	C	3											1						
Constantine	C						1												
Oran	C											3							
Brazil:																			
Porto Alegre (alastrim)	C	1	1	26		14	14	8	20	8									
Rio de Janeiro	C						2												
British East Africa (see also table below): Tanganyika	C	242	522	95	3	1		13	7	26	18	334	23	1					
	D	37	60	6	1					1		35	1						
British South Africa: Southern Rhodesia	C	1	1	153	2	54	1	38	12		4								
	D								2		1								
Canada:																			
Alberta	C	1	1	22					1						19			7	
British Columbia—Vancouver	C	6	2	2		3					1				1	2			
Manitoba	C		1																
Winnipeg	C															1			
Ontario	C	20	10	19	16	20	9	14	7	12	3	1	1		8	8	10	3	
Kingston	C													2	4		1		
North Bay	C													1		1			
Ottawa	C	7	5		14		9	14		8	1	1			2		1	1	1
Sault Ste. Marie	C															1	11	8	5
Toronto	C		1							2	2								
Quebec	C	5							1			1						2	
Montreal	C	7																	
Saskatchewan	C	8	1	3		2			2		16						7	6	
China:																			
Changking	C	P	P	P	P	P	P	P	P		P	P							
Foochow	C	P	P	P		P		P		P		P							
Hong Kong	C													1					
Manchuria—																			
Harbin	C	2				1													
Kwantung—Dairen	C								2		1	1	1						
	D											1							
Nanking	C	P	P	P	P	P	P				P	P	P		P				

Shanghai—																				
Foreigners only	C	3	18	1	1		1				3	5	4	2	6		1			
Including natives	D		2					1				4	5	1	1	4	2			
Swatow	D	4	2	4	1	1		1	1			2		2	1	2				
Tientsin	C			1			1		1	1										
Chosen (see table below).																				
Colombia:																				
Barranquilla	C	2																		
Buenaventura	C	2																		
Cali	D			2							1									
Curacao (alastrim)	C	1																		
Dutch East Indies:																				
Java—Batavia and West Java	C	12	11	14	2	13	11		2		2	2	2		2					
	D	5	4	4	2	1	1		1			1			1					
Sanggi Islands	C	36	14		29															
	D	2	3		3															
France (see table below).																				
Greece (see table below).																				
Great Britain:																				
England and Wales	C	344	341	325	86	87	92	107	116	160	95	137	138	135	164	228	187			
Bradford	C		3	1	1						1				1					
Cardiff	C			1																
Leeds	C			1			2								2					
London	C	164	120	29	32	41	47	52	67	27	48	42	27	38	48	48	45			
London and Great Towns	C	268	223	52	58	68	82	88	136	74	112	111	105	131	162	162	154			
	D		1		1					1										
Stroke-on-Trent	C	2	1		1															
Scotland	C	5																		
Honduras:																				
Naco	C		5													4	7	1		
Puerto Castilla	C																			
India	C	4,877	3,131	2,322	570	499	644	699	787	865	1,037									
	D	1,246	680	572	242	104	108	152	221	174	274				1	1	2			
Bombay	C	12	6	1							1				1	1				
	D	10	5								1									
Calcutta	C	25	14	12	2	4	3		3	5	6	4	10	19	15	15	28			
	D	21	9	11	2	2	3		3	2	4	2	7	13	10	10	16			
Cochin	C	14	3	12	3	5	10	7	4	5	6	7	6	7	2	5				
	D		1	1	1			2	2		2					1				
Karachi	C	4	4						2	1										
	D	3	2							1										
Madras	C	38	34	19	2	1	2	4	3	5	6	6		1	3	4				
	D	11	6	8			2				2	1			1					
Moulmein	C	2	1																	
	D	1	1																	
Negapatam	C	4	9	14	2	2	2	3	3		1	2								
Rangoon	C	3		2			1			1										
	D						1													
Tuticorin	C			1																
Vizagapatam	C			1																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases: D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended Oct. 25, 1930	Nov. 1	Nov. 8	Nov. 15	Nov. 22	Nov. 29	Dec. 6	Dec. 13	Dec. 20	Dec. 27	Jan. 3	Jan. 10	Jan. 17	Jan. 24	Jan. 31
India (French):																			
Chandernagor	C		3	3		3								5					
	D		2	1		1								2	1				
Karikal	C	9	5	1											1	2			
	D	9	2	1												2			
Pondicherry Province	C	22	35	38	2	2		7	7	7		5	8	8	7				
	D	22	33	36	2	2		7	7	5		5	7	8	7				
India (Portuguese)	C	9	4																
	D	2																	
Indo-China (see also table below):																			
Pnompenh	C			2						1				2					
	D	1								1									
Saigon and Cholon	C	1	1			2			2	1		1					3		
	D	3	1			2			1			1					2		
Iraq:																			
Baghdad	C	1	1	2															
	D	1																	
Mosul Liwa	C			69			6		7	9						1		2	
	D			27					1	1									
Ivory Coast (see table below).																			
Mexico (see also table below):																			
Jalisco (State) Guadalajara	D	1		3	1		1	1	1		2							1	
Juarez	C	2																	
	D	1		1	1														
Mexico City and surrounding territory	C	10	12	13	1	3	3	2	1	2		3							
	D	6	5	3	1		1					6							
Vera Cruz	C					1													
Morocco (see table below).																			
Nicaragua: Porto Cabezas	C												2						
Poland	C				2	3		3	1	2						2			
Portugal:																			
Lisbon	C	50	27	16	12			8	11		15	11	21	17		34			
Oporto	C	1																	
Siam	C			1															

Somaliland, British: Boales	C			1			1				1					1				
	D			1																
Spain	C	2	5		14	5	11	21	23	21	23		19	31	18					
Straits Settlements	C	8	6	5	3	3	4		3	9	1	3	3		1	3				
	D	3	1	1		1	1		1	2		2	2							
Sudan (Anglo-Egyptian)	C	42	128	82	3			2		3		47		47		17	1	7		
	D	3	52	7				1				5		5		1		7		
Sudan (French) (see table below).																				
Switzerland: Berne Canton	C	2		1																
Syria (see table below).																				
Tunisia: Tunis	C			2											13	4				
Turkey (see table below).																				
Union of South Africa:																				
Cape Province	C		P	P	P	P	P	P	P		P	P	P							
Orange Free State	C	P				1	1	P	P	P	P									
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P	P							
Upper Volta	C									6						4				
On vessel:																				
S. S. Muncaster Castle at Manila from Hong Kong	C													1						
S. S. Matheran at Suez from Calcutta	C																	1		

Place		June, 1930	July, 1930	August, 1930	September, 1930	October, 1930			November, 1930			December, 1930		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	213	238	93	192	32	62	164		86		38	9	14
Ivory Coast	C							4		2		9		
Sudan (French)	C	76	34	39	P		17					43		
	D	18		3			2					16		4
Syria: Beirut	C	7	2	1										

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
British East Africa (see also table above):							
Kenya	C	186		424			
Chosen	C	3	2				
Seishin	C	2					
France	C	1					

Place		July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930	Dec., 1930
Greece	C	1	6				
Mexico: Durango (see also table above)	D	3	3	2			1
Morocco	C	3	8	4	4	20	
Turkey	C	51	21	19	74		
	D	13	4	2	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Sept. 21–Oct. 18, 1930	Week ended— Oct. 25, 1930	November, 1930 1	8	15	22	29	December, 1930 6	13	20	27	January, 1931 3	10	17	24
Algeria:																		
Algiers	C	2	3				1			2								
Constantine Department	C	3		2	1					1		1			3	3		
Oran	C	1	1	3						3		2						
Bulgaria	C	1	4	6			1	2	1	1	3	6	3					
	D												1					
China:																		
Manchuria—Harbin (see also table below)	C	2	2	1							1							
Shanghai	C	1																
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	3	1				2	1	1								
	D		1					2										
Beheira Province	C		1										1					
	D												1					
Cairo	C	7	2									1	1					
Port Said	C	4	1	1		1	1											1
Great Britain: Scotland—																		
Clydebank	C														3			
Ireland:																		
Irish Free State—																		
Mayo County—																		
Castlebar	C	1																
Westport	C	1																
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D		1	2														
Mexico City, including municipalities in Federal District	C	9	7	8	1	1	5	4	1	1		12						
	D	2	2	2	1		3		2	3		2						
San Luis Potosi	D										1	1						
Morocco	C	8	2		1		1	1	1				8					
	D			1														

Palestine	C	3	3	3			2	1	1	6			1	1		2		1
Poland	C	34	23	22	7	8	15	7	12		21	9		5	28	11		
	D	3	1	2					1		3	3						
Portugal: Oporto	C	1		2		2	1	1	2	2	15							
Rumania	C	9	4	14	4	13	10	14	19		2							
	D	2					1	1	1									
Spain	C		1	2			4				1							
	D		1	2							1							
Tunisia	C	10	6	12					5		23							
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P		P					
Municipality of East London	C		2	1				1	1									
Natal	C	P	P	2	P	P	P											
Orange Free State	C	P	P															
Transvaal	C	P	P	P	P	P	P	P	P	P			P					
Yugoslavia (see table below).													P					

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
China: Harbin (see also table above)	C		14	5		3	
Chosen: Seoul	C	2	3	2	1	7	1
Czechoslovakia	C	1		1			16
Greece: Athens	C	3	6	6	4	4	4
Latvia	C	3	3	1	2		

Place		June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Nov., 1930
Lithuania	C	16	18	7	24	1	5
	D			1	2		1
Turkey	C	2	7	11		28	3
Yugoslavia	C	6		2		2	2
	D			1		1	

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para—	
June 23, 1930	2
July 29, 1930 (death)	1

	Cases
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 4, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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